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NOTICE

The Journal invites medical and dental staff to send in original papers on professional subjects, [illegible] and other matters. Items of news and matters of interest in the naval medical service will be welcomed from ships and establishments on home and foreign stations. [illegible] marriages and deaths are inserted free of charge to subscribers.

Articles and correspondence may be sent at any time to **The Editor, Journal of the Royal Naval Medical Service, Institute of Naval Medicine, Alverstoke, Hants, PO12 2DL**. Two copies should be submitted in typescript. Double spacing should be used throughout.

References—the name of the author and the date of publication are given in the text thus (Smith (1935) believed this to be due etc. or [illegible] lack of basic information on the strategic fundamentals of the science of the sea (Cirkson 1956). The list of authors quoted is put at the end of the article in alphabetical order. Each reference in the list should give in order: the author's name, initials, the year of publication (in brackets), the title of the paper, the name of the journal *in full*, the volume and the number of the first and last pages. For books, the place of publication should be stated and the publisher's name.

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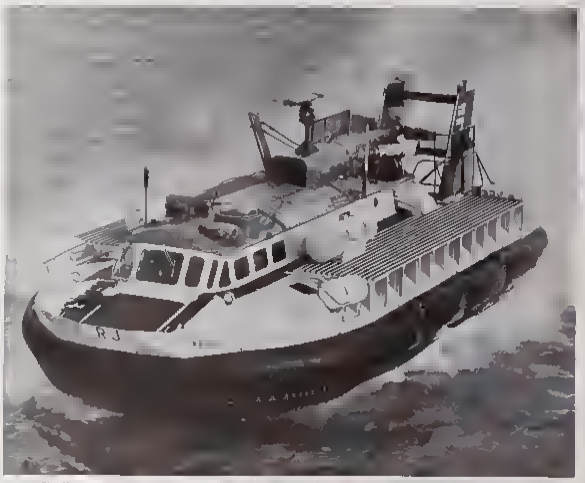

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Editorial

Occupational Medicine in the Royal Navy

In the past few years the concern of naval medical officers with living and working conditions in ships has seen a number of significant changes With the development of submarines capable of lengthy underwater patrols medical officers have been closely concerned with the need to maintain a habitable environment and have been, and remain, involved in research programmes to ensure that this way of life has no short — or long — term effects upon health

Surface ships have evolved slowly over many centuries Medical Officers only gradually became concerned with the overcrowded, ill-lit and poorly ventilated living conditions in the great sailing men-of-war of years ago and with the effect of these conditions upon health — particularly with the spread of infectious diseases. With the introduction of the iron ship and steam propulsion there was relatively little change in living conditions for the seamen Modern warships have become increasingly complex in design with ever more sophisticated machinery and equipment being introduced and greater pressure than ever before upon the limited space below decks At the same time civilian living standards ashore have improved dramatically and the expectations of the sailor for his environment afloat have risen in consequence There would be found few stokers now prepared to heave coal in intense heat and grimy dust for hours with wholly inadequate washing facilities to follow_ a hammock (with another eighteen inches away on either side) on which to rest and storage space for nothing but the barest essentials

In the post war years conditions have changed greatly for the better with clean well lit messdecks and vastly improved working conditions and food Changes continue to take place and there is as great a need as ever for watchfulness by the naval medical officer to guard against any adverse interaction between man and his environment To this end a Naval Medical Officer of Health was appointed to the Fleet in 1973 to coordinate the preventive aspects of health care in surface ships The Health and Safety at Work etc Act 1974 will bring greater pressure to ensure that standards already high, are beyond reproach and the occupational hygienist appointed to the Institute of Naval Medicine in 1974 will work with NMOH (Fleet) to ensure that this is so The Environmental Research Working Party was established to optimise research effort in environmental and occupational health and to ensure that such work meets the operational requirements of the fleet To obtain better overall coordination of the work of medical officers at sea and in establishments ashore the administrative structure of the naval medical service has been changed and the Surgeon Rear Admiral (Ships and Establishments)

appointed Closer liaison has been achieved with ship and equipment design authorities to ensure that there is medical input at an early stage to protect the health of the sailor and to obviate the need for expensive alterations and additions With the development of the hovercraft for naval use new problems are being encountered.. particularly with noise and vibration and naval medical officers are actively concerned with the development programme

New entry medical officers courses have long been aimed primarily at introducing the doctor to the Royal Navy and to the differences in clinical practice between naval and civilian life In 1976 the course has been re structured to give greater emphasis to the occupational health role of the naval medical officer There are many fascinating challenges in this sphere of naval medicine and there is a great need to attract young doctors interested not only in the personal health of sailors but in their health as an occupational group

The need for the highest standards of clinical care are as great as ever before but these changes in administration. function and training within the naval medical service to give greater emphasis on the living and working environment are welcomed as being in the best interests of the Royal Navy..

Postgraduate Training at Sea

There are many difficulties in arranging adequate postgraduate training facilities for medical officers while serving away from the U K in H M Ships At the same time it is important that this valuable experience should not be lost as a valid period of general professional training and the Medical Director General s Department is currently investigating how training facilities may best be used at sea so that medical officers may continue their education and training A wide variety of training systems is under study with suggestions for the distribution of different types of material, supervision of training and small research projects by appointed tutors and the role of the libraries at the Institute of Naval Medicine and RN Hospital Haslar This investigation will take into account the views of medical officers who have had sea experience in the last fifteen months A Committee has devised a questionnaire which was distributed in February — though any who have not received copies may write for one to the Institute of Naval Medicine After studying the results the Committee will report through the Surgeon Rear Admiral (Ships & Establishments) to the Medical Director General (Naval) who will decide the further action necessary to ensure that a cost effective system for continuing training is established The editor will welcome views on this topic as it is most important that an effective programme be established within the financial and operational commitments of the Service While the needs of the Naval Medical Service must take priority over those of the further training of medical officers for appointments elsewhere every opportunity is sought to ensure that training needs are met and that the Naval Medical Officer is seen to be the equal of his civilian colleagues in every respect

*Why are Osteoarthritic Joints Painful?

C. J. Bulstrode

Introduction

Osteoarthritis has been defined by Sokoloff (1969) as "a non inflammatory disorder of joints characterised by deterioration and abrasion of articular cartilage and also by the formation of new bone at the joint surfaces." As Bentley (1972) has pointed out, from a clinical point of view osteoarthritis is present when a joint ceases to fulfil its load-bearing function. Primary osteoarthritis is principally a disorder of old age and causes great disability and pain. As the average age of the population in the Western world increases its importance in reducing the quality of life will become increasingly significant. In England today over 3 per cent of the population over 55 years old suffer from osteoarthritis (Danielsson 1966). Although limited joint movement and deformity are problems it is the pain which causes most distress in the patient as it may persist even when the joint is not being used and so disrupt all aspects of life including sleep. Despite the fact that the disease is commonly called osteoarthritis there is no evidence of a primary inflammatory process and increasingly it is being referred to as osteoarthrosis (Bentley 1972).

In this paper an account is given of the pathways and physiology of the perception of pain and the anatomy of synovial joints with emphasis upon the distribution of the nerves which could mediate pain. The pathological process of osteoarthritis is then described with reference to the above section and an attempt made to correlate existing knowledge of the way in which the pathological process could lead to appropriate stimulation of the nerves mediating pain.

The Anatomy and Physiology of Pain

The study of pain is complex due to the subjective nature of the sensation and the difficulty of carrying out studies in animals. The response of humans to painful stimuli varies dramatically between experimentally naive and experienced subjects as well as in the same individual depending upon his 'mood'. In animals there is no satisfactory way of measuring pain as it is impossible to distinguish a reflex general response from an emotional response.

Types of receptors for pain

If pain is mediated through a single type of receptor then free endings are the only ones ubiquitous enough to perform the task since these are the only type found in the cornea which is sensitive to pain. However free endings appear to be able to provide information on all modalities of sensation as they are the only ones found in some areas of skin sensitive to heat, cold, light touch, vibration and pain (Hagen, Knoch, Sinclair, Wedell 1953). Sherrington (1900) stated that "The sensorial end organ is an apparatus by which an afferent nerve fibre

*This paper won the Radcliffe Pathology Prize 1975

is rendered distinctly amenable to some physical agent and at the same time rendered less amenable to the shielded from other excitants. It lowers the value of the limen of one particular kind of stimulus it heightens the value of the limen of stimuli of other kinds. This definition explains the ability of free endings to be sensitive to all modalities while still being primarily pain receptors

The free endings resemble the unmyelinated fibres from which they arise but contain small vesicles and mitochondria. They are completely enfolded in a Schwann cell and in such places as the adventitia of blood vessels may form a lattice rather than being free endings as such. The way in which these receptors are sensitive to pain is not clear but the primary stimulus appears to be damage to tissues. This may be mediated by the release of chemicals such as bradykinin histamine and serotonin. Prostaglandin E1 is produced in response to painful stimuli and may be the substance which directly stimulates the pain receptor since it is known to reduce the threshold of pain from mechanical and chemical stimulation (Ferreira 1973) and its antagonist aspirin inhibits this response (Vane, 1971). The stimulus for pain perception may not be entirely through this system since direct stretching of axons in the dorsal roots (Perl 1968) can also cause pain while in muscle the accumulation of cellular metabolites may be the source of ischaemic pain (Lewis 1942). It is not clear how this ischaemic pain is mediated but the reflex dilation of blood vessels in response to cellular metabolites may lead to stretching of fibres in the walls of the vessels

The receptors of pain do not appear to adapt or fatigue. The nerve fibres associated with these receptors are small and slow conducting. Impulses from fast fibres appear to modify the transmission of information from small fibres at the level of the spinal cord (Wall & Cronly Dillon

Diagrammatic representation of the Gate Control Theory of Pain

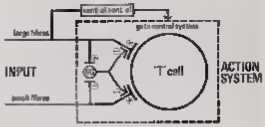

Fig 1

1960) although they adapt more rapidly than the small fibres. This finding has led to the Gate theory of pain perception of Melzack and Wall (1962) (Fig 1) who suggested that it is the differential between the firing rate of the fast and slow fibres which provides information leading to the perception of pain. They have even demonstrated so called T cells in the spinal cord which are stimulated by slow fibres but inhibited by fast fibres. Certainly electrical stimulation of large fibres can block the perception of pain while selective malfunction of large myelinated fibres may lead to hyperaesthesia (Wall & Cronly Dillon 1960). From the spinal cord pain information appears to pass up the spinothalmic tracts to the centro-basal areas of the thalamus. There is some evidence that the transmission of information up the spinothalmic tracts can be inhibited by descending impulses from higher centres in times of high stress (Beecher 1957 Magonn 1963) and this may account for the observed fact that battle casualties may experience no pain for some time after severe injuries. The frontal lobes appear to be involved in the perception of pain by the higher centres as a pre-frontal leucotomy allows perception of pain without causing distress to the patient

The Anatomy and Physiology of Synovial Joints (Fig 2)

(a) Articular cartilage (Fig 3)

Synovial joints are articulations between bone ends in which the articular surfaces

DIAGRAMMATIC REPRESENTATION OF A SYNOVIAL JOINT

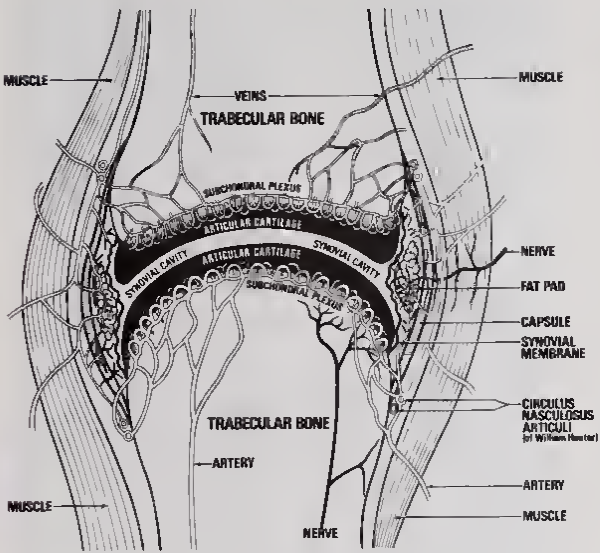

Fig 7

are covered by hyaline cartilage, which is lubricated by synovial fluid Articular cartilage has a highly specialised structure and consists of nests of cells in a bed of matrix around an interlacing network of collagen The sulphate radical of the chondroitin sulphate in the matrix is highly hydrophilic and the water attracted into the cartilage makes up 70 per cent of its bulk (Linn & Sokoloff 1965) and contributes greatly to its strength by producing turgor rigidity in the collagen network (Bentley 1972) This rigidity holds the collagen net tightly in the correct position for maximum strength and loss of water from the cartilage for any reason leads to rapid wear and tear of the cartilage (Bentley 1972) The thickness of articular cartilage varies from 1 to 10 mm depending on the size of the joint Cartilage also varies in thickness

Diagram of the microstructure of articulating cartilage

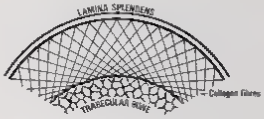

Fig 3.

within each joint and is thickest on the apex of a convex articulating surface and on the rim of a concave one so that it contributes to the overall shape of the articulating surfaces (Gray s Anatomy 1973)

(b) Synovial membrane

The synovial membrane spreads from the rim of one articular cartilage area to the rim of the opposite surface covering all non articulating parts of the joint as well as bursae and tendon sheaths The membrane is thrown into folds which will form villi and allow the membrane to stretch over the joint in all positions The intima of the synovial membrane is composed of Type A and B cells which produce different components of the synovial fluid (Barland Novikoff & Hamerman 1962) The other functions of the synovium apart from the synthesis of synovial fluid are to supply oxygen and nutrients to the synovial fluid and thence to the articular cartilages to remove metabolites and to phagocytose any small pieces of joint debris produced by wear and tear in the joint The intima of the synovium rests on a highly vascular subintimal layer which is well endowed with elastic fibres to prevent the synovium becoming caught in the joint. Beneath the synovium in some joints there are fat pads which serve to keep the synovium in close contact with the articular surfaces and thus to maximise its lubricating and nutrient functions (Gray s Anatomy 1973)

(c) The capsule

Surrounding the whole joint is the fibrous capsule, consisting of parallel and interlacing bundles of connective tissue This extends from a brassard or cuff around one articular surface to a similar cuff around the other articular surface The capsule is perforated by articular nerves blood vessels and lymphatics which will be discussed later In places the capsule may be thickened to form ligaments along lines where strain is likely to be greatest (Gray s Anatomy 1973) It may also be further reinforced by muscle tendons Around the capsule are the muscles acting over the joint which not only supply the motive power to the joint but also protect the joint from extremes of movement

(d) Blood supply and venous drainage

The blood supply to synovial joints is derived mainly from vessels entering through the capsule which form a sub synovial plexus in the subintimal layer of the synovial membrane A second blood supply which is probably subsidiary in the adult is a plexus immediately beneath the articular cartilage which is derived from vessels running within the cancellous part of the end of the bone This plexus sends loops into the deepest partly ossified layer of the articular cartilage However, in the adult there are no blood vessels nerves or lymphatics within the true articular cartilage

The venous drainage of joints has been studied using radio opaque dyes (Pistolesi 1962 Phillips, 1966 Phillips Bulmer Hoyle & Davies 1967) These studies indicate that the majority of venous drainage passes out through the fibrous capsule and through the muscles around the joint Some veins pass down fascial planes between the muscles and the capsule A small proportion of blood in an adult joint passes down the shafts of the articulating bones through the fused epiphyseal plates into the medulla of the shaft of the bones (Phillips 1966) In an osteoarthritic joint this pattern may be dramatically altered

and this will be discussed later

(e) Neurology of synovial joints

In 1891 Hilton stated that 'The same trunks of nerves whose branches supply the groups of muscles moving a joint also furnish a distribution of nerves to the skin over the insertion of the same muscles — the interior of the joint receives its nerves from the same source.' The study of nerves and receptors in joints has been greatly hindered by the difficulties of taking serial sections through ossified tissue and the problems inherent in demonstrating the histology of small unmyelinated nerves. Indeed, when in 1961 Barnett reviewed the neurology of joints (Barnett Davies & Maconail 1961) he was forced to say that In the light of present knowledge it is impossible to define with any precision the role of receptors in the joint tissues in the control of posture movement tone of muscles and so forth Wyke (1967) has divided the nerve supply to joints into two main categories (1) Specific articular nerves which arise from peripheral nerves and tend to run with blood vessels within the joint (2) Non specific articular branches of related muscle nerves which arrive through the body of the muscle and are embedded in intra fascicular connective tissue Wyke (1967) has made a study of the types of nerves found in the joints their distribution and function His findings are summarised in Table 1

Wyke also made a comprehensive study of the types and distribution of receptors in the joint The results of this study are summarised in Table 2 His findings are that receptors concerned with pain are absent from the synovial membrane while the articular cartilage is devoid of all forms of nerve receptor

Wyke also carried out electrophysiological studies on the nerves round joints and suggests from these studies that Type I receptors exert a tonic reflex inhibition of all movements Type III boost the start of movements and Type IV stimulate non adapting activity in all the muscles around the joint as a positive reflex It should however be emphasised that other authors have been more reticent on the types and functions of nerves and receptors in various parts of the joint because of the difficulty of staining unmyelinated nerves specifically and differentiating them histologically from similar collagen fibres

The study of the physiology of pain receptors in joints has suffered from similar confusion in the literature which has by no means been resolved by Wyke s studies The difficulties have arisen over the problems involved in quantifying pain the difficulties inherent in studying pain in animals, and

Table 1
Composition of articular nerves from Wyke (1967)

Group Number	*Diameter Range (μ)*	*Structure*	*Function*	*Distribution*	*Representation in large joint*
I	13 17	Large myelinated	Mechanoreceptor	Joint ligaments	<10%
II	6 12	Medium myelinated	Mechanoreceptor	Fibrous Capsule and fat pads	45%
III	2 5	Small myelinated	Pain afferent	Fibrous capsule and fat pads	45-55%
IV	2	Unmyelinated	Pain afferent Vasomotor eff	Ligaments and walls of blood vessels	

Table 2
Classification of articular receptor systems—from Wyke (1967)

Type	*Morphology*	*Location*	*Parent nerves*	*Behavioural characteristics*
I	Thinly encapsulated globular corpuscles in clusters of 3 6	Fibrous capsule of joint (mainly superficial)	Small myelinated	Static and dynamic mechanoreceptors. Low threshold Slow adapting
II	Thickly encapsulate caudal corpuscles in clusters of 2 4	Fibrous capsule of joint (mainly deep) Fat pads	Medium myelinated	Dynamic mechanoreceptors Low threshold Rapidly adapting
III	Thinly encapsulated fusiform corpuscles	Joint ligaments	Large myelinated	Dynamic mechanoreceptors High threshold Very slow adapting
IV	Plexuses and free nerve endings	Fibrous capsule fat pads ligaments Walls of vessels	V small myelinated Unmyelinated	Pain receptors High threshold Non adapting

the problems only partly resolved by the Gate theory of Melzack & Wall (1962) that pain may be mediated by a differential in signals from different nerves rather than specific pain fibres

One of the first attempts to localise the source of pain in joints was by Sappey (1889) who carried out experiments on joints where a limb had been amputated through a joint because of trauma or infection He found that tugging the exposed synovium was painless and concluded that the synovium could not perceive pain This finding was criticised by later workers on the grounds that a disarticulated joint is hardly likely to be endowed with a normal nerve or blood supply In 1900 Bloch found that pricking the capsule ligaments and synovium of the joint of a healthy patient was painless but Lennander (1906) found the opposite to be true, and stated that both the ligaments and synovium were exquisitely sensitive to mechanical electrical and chemical stimulation Kellgren & Samuels (1950) made a careful study on themselves and found that in the knee the synovium was insensitive to prick and scratch apart from a few scattered areas The fibrous capsule and ligaments were however very sensitive to pin prick and pressure They supported their findings by pointing out that although a ligamentous tear may be very painful synovitis is often painless In support of this Leriche (1930) has found that injecting local anaesthetic into the joint space of sprained joints does not relieve the pain while intra capsular injection does Gardner (1950) has pointed out that much of the pain perception in joints appears to be mediated by nerves in the adventitia of blood vessels which are extremely sensitive to changes in pressure and produce a sensation of deep boring pain when stimulated Phillips (1966) and Phillips Bulmer *et al* (1967) reported that during their experiments involving the injection of radio opaque fluid into the medulla of the head of the femur an increase in pressure resulted in the patients experiencing a deep boring pain They concluded that this is a result of dilation of the vessels by the radio-opaque fluid being forced in under pressure Payr (1926) has noted that in hyperaesthetic joints muscle spasm is prominent and that this can be a potent source of pain because of the metabolic acidosis produced

In summary the articular cartilages are insensitive to pain, while the synovium is only locally sensitive to pain possibly only when the walls of blood vessels are stimulated The variation between early studies can be explained because of the difficulty of stimulating the synovium in isolation as the capsule which is in close apposition to it is undoubtedly exquisitely sensitive to pain The other sources of pain in joints are the result of muscle spasm however produced and increase in pressure within the bone around the joint

Pathogenesis of Osteoarthrosis

The first change observable in an osteoarthritic joint is a reduction in the ratio of glycosaminogens (chondroitin sulphate) to collagen in the articular cartilage (Fessel & Chrisman 1964 Sokoloff 1969) This leads to a reduction of water in the cartilage for reasons described above and hence loss of the turgor pressure which maintains the collagen structure (Bentley 1972) The collagen fibres are thought also to become unmasked by this process and exposed to excessive flexural and torsional stresses which lead to their rupture In this way the articular cartilage undergoes flaking fibrillation fissuring and erosion (Collins 1949) The superficial chondrocytes die while those in the basal layer become clustered into groups of 20 or more cells It is of interest that these initial changes do not always occur in the area of the articular surface subjected to most of the stress and strain but in what have been called by Trueta and Harrison the non load bearing areas of the articular cartilage These are the areas of cartilage which only come to bear in extremes of movement (Harrison Schajowicz & Trueta 1953)

Theories on the cause of the initial changes

In 1959 Johnson suggested that the cartilage breakdown is initiated by a failure of remodelling of subchondral bone with increasing age but it is difficult to assess this hypothesis as the hypertrophic changes in osteoarthritis mask any initial failure in remodelling

In 1969 Chrisman suggested that compression of the articular cartilage could if excessive lead to release of lysozymes from the superficial chondrocytes which cause breakdown of the proteoglycans in the matrix and unmasking of the collagen, leading to fibrillation and breakdown of the cartilage Although the enzyme cathepsin B has been demonstrated in the lysozymes of chondrocytes by Ali (1964) and Barland, Janus & Sanderson (1966) it does not explain why the initial changes occur in non load bearing areas

Harrison *et al* (1953) have suggested that rhythmic pressure on the articular cartilage serves to increase the rate at which nutrients are made available to the cartilage and that in non load bearing areas there is poor nutrition due to infrequent pressure. This would then lead to death of the chondrocytes and breakdown of the cartilage

Radin Paul & Rose (1972) have demonstrated that repetitive loading of the joint can lead to trabecular fracture in the bone under the cartilage as a result of fatigue They have suggested that the resultant stiffening of the following repair increases the stress on the cartilage which then breaks down In support of their suggestion they point out that occupations involving considerable repetitive impulsive stress such as using pneumatic drills leads to rapid osteoarthritic changes in the joints bearing the stress Harrison *et al* (1953) emphasised that one of the first changes observable in osteoarthritis is increase in number and bulk of the trabeculae under the load bearing area where presumably the micro-fractures would occur

Freeman (1973) has shown that collagen can suffer from fatigue failure and has suggested that this too might be a cause of

osteoarthritis

In summary it is probable that all these mechanisms contribute to the development of osteoarthritis but that some such as poor nutrition in the non-load bearing areas are more important than others.

The Relation of the Pathogenesis to Pain

As the articular cartilage is devoid of sensation there is no reason why the initial damage to the articular cartilage should result in pain and indeed at post mortem many joints are found with these initial changes in which the patient has not experienced any pain However the changes in the trabeculation of the bone at any early stage suggest either that in some way the body has appreciated' the change in function or structure of the joint or that microfractures occur at a very early stage in the disease process If the latter is true then it is difficult to explain why the microfractures do not cause pain as they presumably also cause rupture and infarction of the small vessels in the area If the former is true the increased trabeculation is presumably in response to increased stress in the load bearing area and this poses the question as to why the behaviour of the individual has changed before the joint has become painful

As cartilage degenerates flakes of cartilage and lysozymes are released into the synovial space. Both these substances have been shown to be highly irritative to the synovial membrane (Fig 4) As early as 1940 Hullen & Gellerstedt showed synovial inflammation in animals after repeated injections of autologous cartilagenous materials into synovial joints, and Lloyd Roberts (1953) showed that even one injection of cartilage was sufficient to cause synovial inflammation He also found that the synovial response was maximal in the most dependent parts of the synovial membrane where large particles tend to collect under the influence of gravity Although the synovium is only patchily innervated the inflammation can indeed lead to pain by stretching the walls of blood vessels Inflammation of the synovium may also cause contraction from fibrosis and this will also lead to pain as a result of undue stretching even in the normal movement The fibrosis spreads to both the capsule and the muscles around the joint and these too become subject to abnormal stretching for similar reasons (Lloyd-Roberts 1953) As both these tissues are well innervated the stretching is appreciated as pain not only because of distortion of free endings lying loose in the tissue but also from tension on endings in the adventitia of blood vessels. The sensation of excessive stretching would also lead to contraction of the muscles around the joint as part of the reflex mechanism to prevent excessive stress to the joint This can cause persistent muscle spasm exacerbated by the strain caused by the muscle fibrosis and could lead both to ischaemic pain as well as pain resulting from the accumulation of metabolites in the muscle. Clinically the presence of muscle spasm is evident from the fact that the range of movement in the osteoarthritic joint of a patient who has just been admitted to hospital is far less than the range of movement after a week's bed rest when the reduction in pain from reduced movement has led to reduced muscle spasm (Bentley 1975)

As the damage to the articular cartilage spreads into the load bearing area complete loss of articular cartilage occurs and the underlying bone becomes exposed This bone is highly vascular and well innervated and the abrasion of these raw surfaces by movement of the joint causes considerable pain At this stage rupture of small vessels in the subchondral plexus leads to haemorrhage into the synovial cavity and further inflammation and fibrosis of the synovium occurs The exposed bone is ill designed to withstand

stress and suffers collapse microfracture and abrasion The response of the bone to this damage is to attempt repair by thickening which accompanied by smoothing of the surface of the cancellous bone. Is known as eburnation The smooth polished surface belies the underlying destructive changes occurring in the bone Microfractures in the bone lead to areas of haemorrhage and infarction Both this and the actual abrasion of nerve ends are potent sources of pain The callus resulting from attempted repair of these multiple fractures leads to further embarrassment of the blood supply and ischaemic pain. Cysts form immediately below the articular surface, composed of fibrous tissue and surrounded by highly vascular bone. although the contents of the cyst itself are avascular It is likely that these are formed as a result of rupture of synovial fluid into the bone surfaces when exposed to abnormal pressures generated in the damaged joint. The production of these avascular cysts under high pressure would further increase the number of nerves exposed to direct trauma and ischaemia and so increase the pain produced

Osteoarthritis is characterised by the dramatic response to the bone damage There is considerable new bone growth which is especially prominent around the edges of the joint surfaces which gives rise to osteophytes and the alternative name for osteoarthritis of hypertrophic arthritis Lloyd Roberts (1953) has suggested that some of the abnormal bone formation is occurring in the chronically inflamed synovium at the external margin of the articular surface, but there is also more widespread new bone formation which Harrison *et al* (1953) have proposed is an abortive attempt to regenerate cartilage They have suggested that the reason why bone is formed instead of cartilage is that the venous stasis in the area produces a milieu which results in the formation of bone instead of cartilage It is probable that new bone formation is occurring all over the articular surface but that in the centre of the articular surface it is worn away as fast as it is formed leaving only the new bone formed around the edge of the articular surface. The erosion of this highly vascular new bone may also be a potent source of pain

Research Into the Causes for New Bone Formation

As early as 1909 Wollenberg ligated the patella veins in dogs and showed that the patellae underwent bone overgrowth as well as loss of cartilage Goldhaft Wright & Pemberton (1930) extended this work and showed that the magnesium content of the bone was raised a situation which they associated with pathological changes in the bone Huggins (1931) autotransplanted urinary bladder epithelium of dogs into leg fascia and into muscles, and showed that in this position the tissue produced bone. Roome & McMastar (1934) extended this work to show that if the mucosa was transplanted into a limb in which the veins had already been ligated there was even greater bone formation than in a similar transplant to the other control leg This excessive bone formation regressed after several months when presumably an adequate collateral circulation had been set up Cheynel (1947) stated that from his studies of the vascular system in cadavers osteoarthritis was a result of diminished blood supply However Harrison *et al* (1953) disagreed with these findings and showed that histologically there was clear evidence of vascular proliferation and hyperaemia in osteoarthritic joints. They also concluded that this was not a result of previous ischaemia as it was one of the first changes observable in primary osteoarthritis They showed that not only was there hyperaemia but also that there were venous sinusoids in the bone around the joints

Pistolesi (1962) made a study of the venous circulation of osteoarthritic joints by injecting contrast medium into the cancellous bone of the epiphyses and reported delayed drainage around osteoarthritic joints Helal (1965) pointed out that there is a higher incidence of osteoarthritis in limbs which have venous varicosities Studies by Phillips (1966) and Phillips *et al* (1967) were carried out to compare the venous drainage of osteoarthritic hips with the drainage of the same joint on the other side of the body in patients with unilateral osteoarthritis. A further study was carried out after the patients had been successfully operated on for relief of pain using an osteotomy operation They found a strong correlation between radiological damage to joints and greatly reduced venous drainage with pooling of the dye at the site of injection They suggested that venous drainage is obstructed by the coarse trabeculae which the bone has formed as well as by capsular fibrosis synovial fibrosis and muscle spasm around the joint

Attempts to Relieve Pain in Osteoarthritis

Neither the injection of local anaesthetic nor of steroids to reduce synovial inflammation have been found to have any long term success in the relief of pain in joints (Helal 1965) The reason for this can be deduced logically to be either that the source of pain is not within the synovium and that it is not primarily inflammatory Local anaesthetic may have a short term effect but this soon wears off and it has no effect upon the deep boring pain that patients experience even at rest Unlike rheumatoid arthritis synovectomy has no effect in reducing pain and it is probable that although the hypertrophied synovium in rheumatoid arthritis is an important source of pain it is not of great significance in osteoarthritis Replacement of one of the articular surfaces with a prosthesis also has little effect on long term reduction of pain although replacement of both articular surfaces as in a total hip replacement removes all pain unless one of the prostheses is loose (Charnley 1970) In this case presumably the same changes of trauma and infarction occur at the interface between the prosthesis and the bone At first appearance it would therefore appear that the pain arises from the articular surfaces as replacement of these results in loss of pain However there are many other effects of a total joint prosthesis such as section of the capsule and some of the muscles around the joint as well as changes in the architecture of the bone around the prosthesis both as a result of the surgery and in response to it Osteotomy that is complete section of the bone close to the joint has been reported as giving dramatic reduction in pain with improvement radiologically in the condition of the joint reformation of articular cartilage and regression of osteophytes (MacMurray 1956) These changes have an unfortunate tendency to regress after a period of months or years with return of pain The study by Phillips *et al* (1967) show that one of the major changes occurring after osteotomy is that the venous stasis in the head of the bone is relieved and it seems likely that the deep boring pain experienced in osteoarthritis is a result of the pressure generated by venous stasis as well as changes in the pH and accumulation of metabolites caused by the poor perfusion of blood. This would account both for the pain at rest and for the increased pain when exercising the joint as the blood supply and hence the pressure increases in exercise.

Conclusion

The pain in osteoarthritis is multifactorial arising from capsular fibrosis muscle spasm collapse infarction and ischaemia of bone venous stasis and possibly inflammation of the synovium It

does not arise from the articular cartilage. These causes of pain are closely interrelated and lead to progressive changes which produce more pain (Fig 4) Any medical or surgical intervention which succeeds in breaking the vicious circle of changes especially of venous stasis may allow repair of the joint and relief of pain However unless the joint is replaced by a prosthesis the underlying cause for the initial changes of increased trabeculation beneath the load-bearing area and degeneration of the cartilage will occur and lead to further destruction abortive repair and pain For this reason hopes of finding a non invasive technique for both preventing and curing osteoarthritis must centre on finding the causes for the initial changes in articular cartilage These may paradoxically be related to loss of sensation in the joint allowing damaging postures to be maintained for long periods. This would explain the increased incidence of osteoarthritis in diabetic and Charcot's joints as well as in old people where response to pain appears to be diminished and the ability of the joint to repair itself reduced

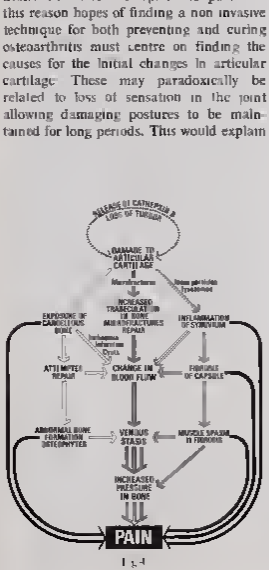

Fig 4

Acknowledgements

I am most grateful to Mr G Bentley 1st Assistant at the Nuffield Department of Orthopaedics for an inexhaustible supply of references and advice and to Mrs Jean Lever for typing the manuscript

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^{47}Ca and ^{85}Sr Absorption and Excretion Compared in Normal Controls

Murdoch A. Macleod

ABSTRACT

[illegible] ^{47}Ca [illegible] ^{85}Sr [illegible] ^{85}Sr [illegible] ^{47}Ca [illegible] *Smith and Nisbet (1964) and 3.5 (Barnes Bishop, Harrison and Sutton (1961) derived from plasma urinary and faecal measurements made over a period of seven days in a hospital metabolic unit*

Introduction

Discrimination between Ca and Sr ion transport across biological membranes has been recognised for some time and amply demonstrated by several workers during the past twenty years. For example discrimination in transport across the gut has been shown to occur by Bailey, Bryant and Lofmit (1960), Samachson (1963), Nordin *et al* (1964) in reabsorption in renal tubules by Harrison, Raymond and Trewarthy (1955), Macdonald, Noyes and Lomek (1957), Barnes *et al* (1961) and in placental transfer by Hodges, MacDonald and Nusbaum *et al* (1950).

Although it is clear that there is discrimination against the transfer of Sr as compared with Ca across biological membranes the mechanism by which this occurs is not understood. Nevertheless a knowledge of how much soluble strontium is absorbed, excreted and retained in any given instance is obviously of vital importance to personnel exposed in radiation accident situations.

This paper reports a simple method of estimating Sr absorption from the gut and demonstrating its biological half life using an arm counting chamber and $^{85}SrCl_2$. A comparison with $^{47}CaCl_2$ kinetics is made and ^{85}Sr excretion estimated from the effective half life curves is shown to correspond closely to that derived from urine and faecal measurements made in a metabolic ward (Shimmins, Smith, Nordin and Burkinshaw, 1966).

Materials and Method

Male volunteer controls had their intestinal calcium absorption measured by estimating the absorbed fraction of a ^{47}Ca

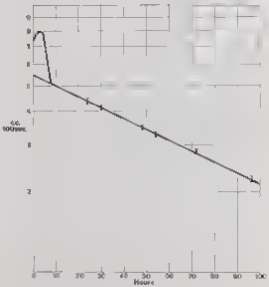

FIG 1. Mean ^{47}Ca effective decay ± S.D. in the forearm following IV injection of 1 µci $^{47}CaCl_2$ in four control subjects.

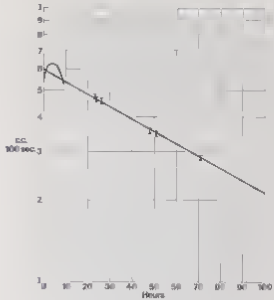

FIG 2 Mean ^{85}Sr decay ± SD in the forearm following IV injection of 5 μci ^{85}Sr in four subjects.

Cl_2 meal using a large volume chamber counter as described in a previous paper (Macleod 1971)

Preliminary studies with four of the subjects established that it took approximately 20 hours for the effective decay of a 1 μCi intravenous dose of ^{47}Ca Cl_2 to become exponential in the tissues bone and blood (Fig 1) Similarly four subjects given 1 μCi $^{85}SrCl_2$ intravenously produced essentially similar effective decay curves (Fig 2) In both the ^{47}Ca and ^{85}Sr absorption studies this was achieved by serial counting of the forearm at one hourly intervals and plotting the subsequent curves All the curves obtained differed little in appearance for both ^{47}Ca and ^{85}Sr and were essentially biphasic In all subjects measured in this way the 24 hour point lay on the exponential part of the decay curve and was thus selected as a suitable time at which to measure arm activity (Figs 1 and 2) The compound curves for the four subjects in both the ^{47}Ca and ^{85}Sr experiments are shown in Figs 1 and 2 without correction for physical decay

Strontium 85 intestinal absorption was estimated using the same arm counting technique (Macleod 1971) in the 11 control subjects who had had their calcium absorption measured previously The intravenous and oral doses of $^{85}SrCl_2$ being 1 μCi and 5 μCi respectively compared with 1 μCi and 10 μCi used in calcium absorption measurements In both cases the carrier media for the oral dose was 100 mg calcium gluconate The same large volume arm counting chamber was used in both experiments with the appropriate settings for both isotopes utilised

Calcium and Strontium Absorption

Calcium 47 and ^{85}Sr absorption measured as a percentage of the oral dose given is shown for the 11 subjects in Table I The mean calcium absorption was 29±3 and the mean strontium absorption 24±3 In all of the subjects the net absorption of radiostrontium was less than that of radiocalcium

Table I

^{47}Ca and ^{85}Sr absorption measured as % of dose given in control cases using 100 mg Ca-gluconate as carrier with mean absorption ± S D

Subjects	^{47}Ca % Abs	^{85}Sr % Abs
R M	30	25
I I	11	33
H I	28	33
D M	30	24
K L	26	20
P C	8	26
R C	36	24
D S	30	24
P B	5	24
P G	11	26
B G	35	31
Mean % Abs ± S D	29 ± 1	24 ± 1

If this discrimination against strontium was simple competitive inhibition it would be expected that the discrimination would increase with increasing amounts of calcium gluconate used as carrier media for the oral doses Six subjects had their calcium and strontium absorption measured using several different carrier loads The results are presented in Table 2

Table 2

Percentage ^{47}Ca and ^{85}Sr absorption for various calcium gluconate carriers (mean ± S D)

	Calcium carrier loads							
	10mg		100mg		500mg		[illegible]	
Subject	% ^{47}Ca Abs	% ^{85}Sr Abs	% ^{47}Ca Abs	% ^{85}Sr Abs	% ^{47}Ca Abs	% ^{85}Sr Abs	% [illegible] A	[illegible]
J C	70	46	30	28	24	15		[illegible]
P G	85	41	31	38	19	7		[illegible]
B G	75	69	35	31	18	12	1	[illegible]
D H	58	52	40	24	25	14		[illegible]
R L	55	45	26	20	20	11		[illegible]
R C	68	45	26	[illegible]	17	11		[illegible]
Mean % Abs	65 ± 8	48 ± 7	30 ± 3	[illegible] ± 4	20 ± 3	13 ± 2	+	[illegible]
Discrimination Factor	0 [illegible]		0 80		0 70			

From these results it can be seen that there is no change in discrimination with increasing calcium intake the average discrimination factor being 0 73 Nordin *et al* (1964) and Shimmins *et al* (1966) found factors of 0 55 and 0 69 respectively using plasma urine and faecal samples the result from the much simpler arm counting technique compares favourably with these latter figures

Calcium and Strontium excretion

Using the effective decay curves (Figs 1 and 2) it is possible by correcting for decay to compare the percentage excretion of calcium and strontium without the tedium of collecting urine and stool specimens (Macleod 1971) This had been done with the curves for the 8 subjects depicted in Figs 1 and 2 when compared in this way the excretion of ^{85}Sr is 3 36 times higher than that of ^{47}Ca This agrees well with a factor of 3 5 found in 6 normal subjects by Barnes *et al* (1961) and a factor of 3 34 found in a large series of patients in a metabolic unit by Shimmins *et al* (1966) using plasma urine and faecal measurements

Discussion

From these results it can be deduced that in male Caucasians over the age of 25 years there is a discrimination in favour of calcium and against strontium by a factor of 0 73 in the intestinal absorption of the radioisotopes of these two elements Recent studies (Macleod and Blacklock 1975) have shown that calcium absorption is affected by age skin pigmentation and ultra violet light thus continuing work in this instance is indicated to discover whether there is a similar affect on strontium absorption

That there is such a close agreement between the excretion factors in favour of strontium found by the method described here and the more tedious blood urine and faecal sample counting method employed by others is encouraging as the saving in patient time hospitalisation and expense is considerable

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PUBLICATION BY RN MEDICAL OFFICERS — ABSTRACTS

BALDOCK, N E & CATTERALL, M D (1975) Erythema nodosum from *Yersinia enterocolitica* *British Journal of Dermatology* December 93 719 720

The first report of this condition in the U K occurring in a 24-year-old female with classical EN affecting the anterior aspects of both lower legs following a holiday in Spain

With many people now spending brief periods abroad the authors feel that YE infection should be considered routinely as a cause of both EN and traveller s diarrhoea in the U K

M A PREECE S TOMLINSON C A RIBOT J PIETREK H T HORN D M DAVIES* J A FORD M DUNNIGAN** and J L H O RIORDAN** (1975) Studies of Vitamin D Deficiency in Mini *Quarterly Journal of Medicine* 44 5 589

From the Middlesex Hospital London *The Institute of Naval Medicine and **Stobhill Hospital Glasgow

With highly sensitive assays for serum 25 hydroxycholecalciferol (25 OH D3) and serum 25 hydroxyergocalciferol (25-OH D2) on the same serum sample it has been shown that endogenously produced vitamin D3 is important in man the findings emphasise the relative vitamin D metabolites as hormones rather than vitamins in the strict original sense

Normal ranges for 25 OH D2 and 25 OH D3 were established by examining white Londoners white Glaswegians and white children and serum parathyroid hormone (PTH) was also measured To examine the roles of dietary vitamin D and endogenous vitamin D in maintaining normal circulating vitamin D levels serum 25-OH D levels were investigated in Asian immigrants medical submariners and geriatric patients with and without vitamin D2 therapy It was found that dietary sources of vitamin D appear to be inadequate and D deficiency was shown to be the cause of rickets and osteomalacia in Asian immigrants and to be an important cause of osteomalacia in the elderly

Secondary hyperparathyroidism was shown to be the rule rather than the exception in vitamin D deficiency and it appeared that the relationship between PTH and D metabolites might not be mediated through changes in serum calcium alone It was postulated that metabolites of vitamin D might directly effect the secretion of PTH

The Interpretation of Step Filtered Equivocal Brain Scintigrams

A S Houston

ABSTRACT
The step filter has [illegible] in assisting [illegible]. The filter is very simple [illegible] [illegible] characteristics [illegible] [illegible] [illegible] some [illegible] [illegible] discussed and examples [illegible] equivocal brain scintigrams are displayed before and after filtering. [illegible] amount of confusion also discussed.

Introduction

The problem of detecting small lesions in brain scintigrams has attracted great interest in recent years. Several filtering and image enhancement techniques have been put forward e g Tanaka and Iinuma (1970) Lorentz, George Meder, *et al* (1972) Corfield (1975). Although these are very useful they are either complicated and time-consuming or require the clinician to have a thorough understanding of the technique if dangerous misuse is to be avoided. As such, these methods are unacceptable to many clinicians. It is hoped that the introduction of the step filter (Houston, 1975) will improve the situation since it is both simple to use and independent of the operator. The only problem for the clinician is that of interpretation which therefore merits some discussion.

Description

The step filter consists of a circle of constant, positive values surrounded by a concentric ring of constant negative values such that integration over the filter gives zero. Since the resultant signal-to-noise ratio (S/N) at each point is output, this will represent the number of standard deviations from the zero mean and will give an indication of the significance of any perturbation present. The filter has previously been optimised to detect small lesions (Houston, 1976).

Technetium — 99m — pertechnetate brain scintigrams are obtained at the Department of Nuclear Medicine RN Hospital Haslar using a Nuclear Chicago Pho Gamma camera with a High Resolution parallel hole collimator with full width half maximum (FWHM) 11.1 mm at 100 mm and field of view 247 5 mm on-line to a Varian 620/L 100 minicomputer. A 64 x 64 matrix array is formed with cell side length

0	−1	−1	−1	−1	−1	0
−1	−1	0	24/13	0	−1	−1
−1	0	24/13	24/13	24/13	0	−1
−1	24/13	24/13	24/13	24/13	24/13	−1
−1	0	24/13	24/13	24/13	0	−1
−1	−1	0	24/13	0	−1	−1
0	−1	−1	−1	−1	−1	0

FIG 1
MATRIX OF CHOSEN FILTER

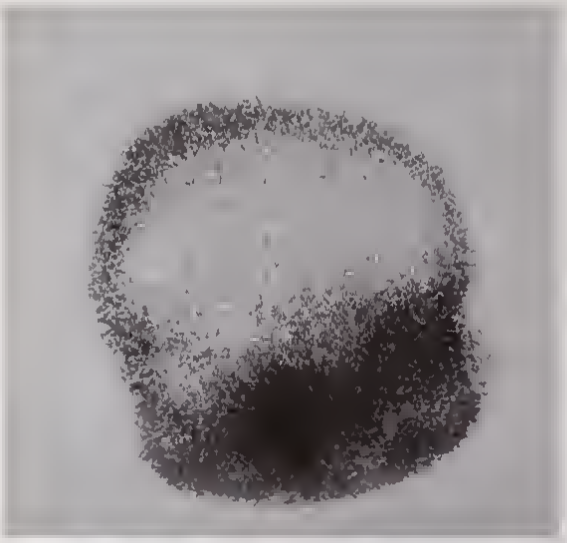


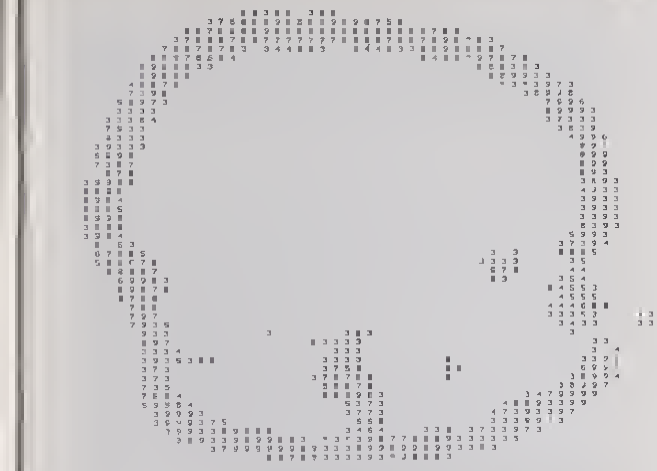
Fig 2a Cut 1 Normal kidneys in image
N B — All [illegible] in right lateral

equal to 3 87 mm

For this system it was found that the best values for the inner and outer radii of the filter were 8 65 mm and 14 59 mm respectively To adapt for a different collimator these figures need only be multiplied by the ratio of its FWHM to that of the above system Given the cell size of the resulting matrix array the appropriate filter can easily be constructed The filter corresponding to our system is displayed in Fig 1 where the constant negative value is chosen as —1 purely for convenience

Application

A computer program written in FORTRAN is at present used to produce the filtered image The integral part of S/N at each point is output for values of three or greater this display being similar to that previously used by Neill and Hutchinson (1971) for the maximum convexity technique In its present form the program takes about two minutes reduction time



CASE 1 FILTERED DISPLAY OF NORMAL BRAIN SCINTIGRAM
Fig 2b

although it is hoped to reduce this considerably by re-programming to ASSEMBLER language

Interpretation

The interpretation of step filtered brain scintigrams is perhaps best discussed by considering particular cases Four patients have been chosen as examples of normal abnormal equivocal (positive) and equivocal (negative)

Case 1 Normal scintigram

For the normal patient (Figs 2a 2b) the usually visible normal variants e g base of brain superior sagittal sinus cavernous sinus etc are visible but the transverse sinus is obliterated Thus any tumour in line with the transverse sinus will show up clearly although caution must be taken in this region as will be discussed later

Case 2 Abnormal scintigram

The large abnormal uptake area obvious

Fig 3a *Case 2 Abnormal brain scintigram*

in Fig 3a shows up clearly in Fig 3b Since the filter is primarily designed for detecting small lesions the background component will contain parts of the tumour and this will manifest itself in the form of "ringing" This is best observed by comparing the numbers at the centre of the lesion with those around them and noting that the largest values sometimes appear at the periphery The number at the centre therefore ceases to be a true guide to the significance of the lesion For tumours which are fairly obvious in the first place this is not a problem.

Case 3 Equivocal scintigram

In the case of equivocal scintigrams the number at the centre of the possible lesion must be considered Although this figure is based on statistical considerations the clinician may regard it purely as a

CASE 2 FILTERED DISPLAY OF ABNORMAL BRAIN SCINTIGRAM
Fig 3b

magnitude corresponding to the equivocal area he can see with his unaided eye If this number is greater than or equal to four then in most instances he may regard it as significant

Fig 4a shows a patient with an equivocal area above the transverse sinus which gives a value of four in the filtered view (Fig 4b) This patient was referred for angiography but was considered too hypertensive. However a further scintigram confirmed suspicions that the lesion was positive

Case 4 Equivocal scintigram

If the value of S/N at the centre of the possible lesion is less than four then the clinician can say that on the evidence of the scintigram alone he does not have enough information to make a positive diagnosis

Fig 5a shows a patient with two equivocal areas one on the temporoparietal region and the other just above the transverse sinus The former does not show up in the filtered view (Fig 5b) indicating a value of less than three while the latter appears as a

couple of threes. Two further scintigrams of this patient appeared normal.

The case where an equivocal area throws up a three is of special interest. Statistically in a 64 x 64 matrix array random noise will occasionally produce such a value. This appears to be so in the case of this patient. On the other hand clinical follow up has revealed at least one case where a small tumour has produced this value. In general when this occurs and especially when the clinical signs and symptoms favour a positive diagnosis further scintigrams at a later date are necessary.

Other Considerations

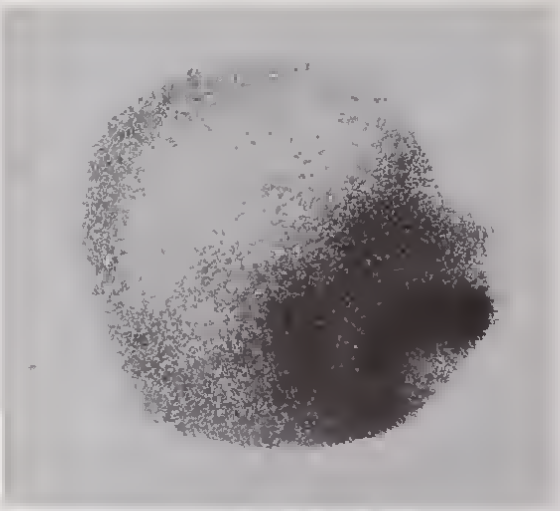
Since the step filter really compares the abnormal area with a surrounding background element problems may arise when the background surface of the scintigram is particularly curved.

If this surface is concave, S/N will be

CASE 3 FILTERED DISPLAY OF EQUIVOCAL BRAIN SCINTIGRAM
Fig 4b

slightly reduced and "false negatives" may occur This may happen when the tumour lies close to but not on top of a normal variant or when two tumours are very close together

When the surface is convex S/N will be slightly increased Since this may produce "false positives" we must take this instance very seriously Fortunately on a brain scintigram the regions which are sufficiently convex to produce this effect are well known They correspond to the normal variants and since most of these are visible on the filtered image there is little problem for the clinician However care must be taken in the region of the masked transverse sinus The detection cut off level should be increased but the clinical data are at present insufficient to determine what this new level should be In one patient a value of five was shown by autopsy to correspond to a tumour while in another a value of four proved negative Clearly more experience with the filter is necessary and it may be



that in this region hind and last rules cannot be made

These aspects apply to every filter with a similar negative or background component Most filters in common use come into this category Since the step filter has a smaller matrix size than most it will be less affected by the comparatively gradual gradient changes found in a normal brain scintigram However it is still important for a clinician to consider the possibility of fairly slight gradient changes and their effects before making a diagnosis

Conclusion

The success of a filtering technique depends largely on the ability of the clinician to interpret its results Despite the problems with background gradient it is felt that the step filter is better than most in this respect as it gives the clinician a figure, based on statistics- relating to the equivocal

CASE 4. FILTERED DISPLAY OF EQUIVOCAL (FALSE POSITIVE) BRAIN SCINTIGRAM
Fig 5b

area in question

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HOUSTON A S (1978) [illegible]

HOUSTON A S (1976) [illegible]

LORENZ W J CORCORAN M E DERR H C [illegible]

[illegible]

The Disto-Palatal Groove in Maxillary Incisors; A Predisposing Factor in Periodontal Disease

Richard T Walker

ABSTRACT

Disto palatal groove [illegible] *discussed in rela* [illegible] *and a* [illegible] *radiographs* [illegible] *described* [illegible]

Introduction

A number of major and minor morphological defects occur in the area of the maxillary lateral incisor Malformations occur in relation to clefts of the palate and supernumerary peg-shaped and dens in dente forms of maxillary lateral incisor occur frequently

A less well known anomaly the developmental groove on the palatal aspect of maxillary incisor teeth also occurs more frequently in the lateral incisor One such groove commences in the region of the cingulum passes between the distal marginal ridge and cingulum and continues along the disto palatal aspect of the tooth In some cases the groove is limited to the coronal portion of the tooth whilst in others the groove crosses the amelo cemental junction and continues along the root to a variable distance

The groove represents a form of invagination possibly due to folding of the enamel epithelium and may be referred to as a disto palatal groove Unlike the invagination that occurs in dens in dente the disto palatal groove is in direct communication with the gingival crevice and has been shown to be a predisposing factor in localised periodontal disease (Lee Lee & Poon 1968 Everett & Kramer 1972) Plaque has a tendency to accumulate in the groove which provides ready access to the periodontal tissues. The effect that this has upon breakdown of the local periodontium ultimately depends upon the extent of bacterial penetration and pocket formation and the resistance of the patient

Case Report

History

The patient a twenty two year old rating reported as a pain case only a few hours before sailing His complaint was that the right maxillary lateral incisor was painful Initial examination revealed that the tooth was very tender to percussion The pain was diagnosed as being of pulpal origin and a vital pulp extirpation was performed under local anaesthetic The root canal was irrigated with hydrogen peroxide and saline and left open One periapical radiograph was taken and forwarded with clinical notes of referral to the Duty Dental Officer at the next port of call Five days later the patient reported still complaining of a tenderness around the tooth It was established on close questioning that the lateral incisor had been tender intermittently for about three months prior to the present treatment The tenderness was described as occurring more on the palatal aspect of the tooth than the buccal There was no history of trauma

Clinical Examination

Visual examination of the region showed an absence of restorations in the lateral incisor Palpation of the buccal sulcus was not painful whilst there was some reaction to pressure on the palatal side The tooth was still sensitive to percussion.

Examination of the periapical radiograph (Fig 1) indicated a diffuse periapical area of radiolucency whilst the lamina dura around the apical third appeared to be intact A narrow radiolucent line was also noticed running in an apical direction from the distal side of the coronal access cavity This unusual radiographic picture prompted a more thorough examination, which revealed the presence of a very deep palato-gingival groove and a 7 mm palatal pocket

Fig 1 [illegible]

Treatment

When it was realised that the groove extended at least a third of the way along the root conservative periodontal treatment was considered impracticable Considering this and the fact that the patient was due to sail the following day the tooth was extracted

Examination of Extracted Tooth

When the extracted tooth was closely examined the groove was found to extend as far as the apical third of the root (Fig 2)

Fig 2 [illegible]

The groove was explored using a No 15 reamer and photographed to demonstrate the depth of the pocket (Fig 3) The groove did not appear to communicate with the

Fig 3 [illegible]

pulp canal and a post extraction radiograph was taken to show the radiolucent parapulpal line more distinctly (Fig 4)

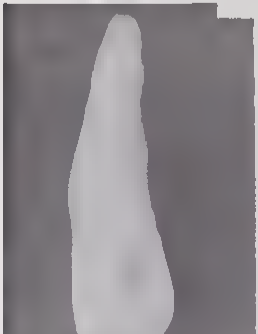

Fig 4 *Extracted incisor radiograph*

Discussion

The abnormality described is similar to the invaginated odontome and it has been suggested that the epithelial attachment in the region of the groove is of defective character (Lee *et al* 1968) This defect can provide access for micro organisms into the periodontal tissues which may lead to localised periodontal disease and it is not inconceivable that this in the presence of lateral canals could quite easily give rise to inflammatory and necrotic changes to the pulp

The symptoms which might arise from these changes are not always easily differentiated and diagnosis may consequently be made difficult

The presence of this type of groove in maxillary incisors and the possible implications of its role as a predisposing factor in periodontal disease should always be borne in mind

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Plastic Repair of Palatal Oro-Nasal Fistula

S. N. Bussell

ABSTRACT

[illegible] as a rare sequelae of a common dental [illegible]

Introduction

An oro-nasal fistula may be defined as being a pathological epithelial lined passage between the nasal and oral cavities. There is a diversity of described aetiological factors which include palatal clefts (Shafer, Hine and Levy 1964) and patent naso palatine canal (MacGregor 1964) as being present at birth. The acquired oro-nasal fistula may result from necrosis caused by a suction cup on a prosthesis (Dal Negro and Graziana 1964) syphilitic osteomyelitis (Woll, Gelfman, Amato *et al* 1970), gunshot wounds (Tucker and Smith 1967). A fistula may be produced deliberately as part of the surgical technique for removal of tumours of the maxilla or inadvertently when operating in the incisor region to excise buried teeth, roots, odontomes and cysts. Over zealous use of hand chisel or dental drill in Torus Palatinus removal (Panuska and King 1962) has also caused this condition. Rowe and Killey (1968) state that the development of an oro-nasal fistula as a result of maxillo facial injury is rare.

With the exception of the patent naso palatine canal the histological evidence to support the true oro-nasal fistula, by definition may be difficult to demonstrate and perhaps a description of palatal defect would be more suitable in some cases.

In contrast to the commonly encountered oro antral fistula (Killey and Kay 1967) the oro nasal fistula is comparatively rare, the acquired variety being especially so and is accordingly sparsely reported.

Case Report

The patient, an otherwise fit young married woman of 23 years presented initially at RNH Gibraltar on August 28 1973 with a chronic discharging palatal sinus associated with a non vital $\underline{\underline{2}}$ which had been conserved with an unlined silicate filling sometime previously in the United Kingdom. An anterior occlusal X ray showed a large radiolucent area associated with the affected tooth, probably cystic in nature (Fig 1).

On September 24 1973 the $\underline{|2}$ was root filled with 1 No 80 silver point and Zinc Oxide paste which was run through the apex (Fig 2) and the patient was admitted for apicectomy and enucleation of the associated cyst under a general anaesthetic with penicillin cover the next day

The apicectomy was performed via a standard buccal approach and the surgeon noted at the time that there was little bony support for the tooth The enucleation of the cyst was performed via a combined buccal and palatal approach the flap being raised at the gingival margin Both the nasal mucosa and antral lining were involved. The cyst lining was sent for histopathological report and the wounds closed with interrupted black silk sutures The original palatal tract was closed separately after paring of the sinus edges Post operative recovery was uneventful the patient being discharged two days after operation having been instructed not to blow her nose The subsequent histopathological report confirmed that the lesion was an inflamed benign apical granuloma/early radicular cyst

The patient failed to attend for her follow up appointments but re presented on March 4 1975 with the $\underline{|2}$ being mobile and the re establishment of the palatal fistula which allowed the passage of food and fluids into the nose She was now expecting her second child and it was decided to extract the offending $\underline{|2}$ and occlude the fistula with a plate in the short term with a view to attempting the closure of the tract surgically in the long run

She was re-assessed on April 1 1975 following the birth of her child In the interim period the denture had been discarded with the consequent loss of $\underline{|2}$ space and the slight forward movement of $\underline{|(L)}$ buccal segment The oro-nasal fistula was now approximately 5 mms in diameter and was proving troublesome. An anterior occlusal X ray taken at this stage (Fig 3) showed that the size of the bony defect had greatly reduced since August 28 1973 A

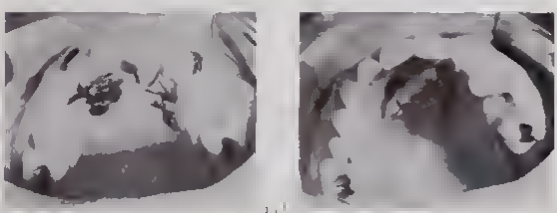
decision was made to re admit the patient to attempt to close the fistula surgically under a general anaesthetic The operation was performed under endotracheal anaesthetic with antibiotic cover on April 22 1975 (Fig 4a b and c) At operation the size of the bony defect encountered was commensurate with the X ray appearance. The flap was pared rotated and sutured over bone the aptly shaped ' cleft palate ' needles being of much assistance at this stage. The flap was held high in the palatal vault by a deep suture attached to the leading edge and tied inter dentally The photographic appearance eight days post operatively is seen in Figs 5a and b before and after suture removal respectively

Fig 4

(a) Diagram of the palatal area and maxillary teeth before operation The black circle represents the oro-nasal fistula and the surrounding broken line shows the approximate size of the bony defect as seen at operation

(b) Diagram of large palatal flap Shaded area represents prepared wound after excision of fistulous tract with pared edges Rotation of flap is indicated by arrow

(c) Diagram of immediate post operative state Shaded area shows residual defect left to granulate after packing with ribbon gauze with Whitehead's varnish The leading edge of the flap is held high in the palate by the suture placed and tied around it



(a) Appearance [illegible] (b) [illegible]

The appearance at final follow up seven weeks post-operatively is shown in Fig 6 All wounds had healed completely and the architecture of the palatal dome had been re-established There was no springing or sponginess of the hard palate and the cessation of the unpleasant symptoms associated with the original condition was much welcomed and appreciated by the patient

Fig 6 *Appearance* [illegible]

Discussion

The clinical presentation and history associated with this condition are such that the problem is one of repair rather than diagnosis.

It is stated by Panuska and King (1962) that almost all perforations of the palate can be repaired by (a) the pedicle flap which utilises the posterior palate vessels or (b) the Van Langenbeck method or a combination of the two basic procedures A method employing 24 ct 36 gauge swaged gold plate similar to the technique for closure of oro-antral fistulae described by Smiler and Mantemorano (1972) has been advocated by some authorities

In suitable cases such as the one described, a palatal flap technique would appear to be perhaps the simplest and safest method of closure available because of the following anatomical factors

1 The blood supply is favourable and enters the flap in a good area on the under surface
2 Thickness of the palatal flap makes it ideal for plastic transportability
3 The flap is easily raised from bone with periosteum intact.

Acknowledgement

I wish to thank Mr C T Parsons the Haslar Librarian for his help in the preparation of this article and I am grateful for the permission of the Medical Director General (Naval) to submit this article for publication

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H.M.S Lochinvar, Port Edgar

D B Jack

O Young Lochinvar is come out of the west
Through all the wide Border his steed was the best
And save his good broadsword he weapons had none
He rode all unarmed and he rode all alone
So faithful in love so dauntless in war
There never was knight like the young Lochinvar

Sir Walter Scott

Lochinvar is a small bleak loch near the village of St John s of Dalry in Kirkcudbrightshire There is a small island on this loch where to this day can be seen the foundations of a castle which was the home of the young Lochinvar

The first *H M S Lochinvar* was an L class Destroyer (3 funnel type) Commissioned in 1915 and serving in the 9th Flotilla she had an honoured career in the First World War Employed in convoy duties and general duties in home waters *Lochinvar* was among the ships which took part in the attacks on Zeebrugge and Ostend in the spring of 1918 She was sold in 1921

The second *H M S Lochinvar* was commissioned on November 15 1939 as a Minesweeping and Patrol Service Training School at Port Edgar, South Queensferry on the southern bank of the Firth of Forth, 9 miles west of Edinburgh

South Queensferry is an ancient Royal Burgh which in May 1975 was absorbed into the Edinburgh District of the new Lothian Region It stands between the two massive bridges spanning the Forth the cantilever bridge carrying the railway and the suspension bridge* carrying the A90 road

R N Barracks HMS Lochinvar (1939 1950) [illegible] the Firth of Forth water

Port Edgar is named after Edgar Atheling who landed there in 1067 a fugitive from William the Conqueror His sister Margaret was also a fugitive and eventually married the King of Scots Malcolm nicknamed Canmore or "Big Head" Queen Margaret travelled frequently between Edinburgh and Dunfermline Abbey in Fife crossing by

A tale is told of a young sailor returning to LOCHINVAR after a successful run ashore who crossed the Firth of Forth by making his way up the massive cables and over the two towers of the unfinished road bridge. Hoist on shoulders of relatives he received a warm welcome on his return to the ship. Editor

ferry at the narrows giving the name of the Burgh of Queensferry. A ferry service was maintained across the Forth at Queensferry until the opening of the bridge in September 1964.

To facilitate travel from Edinburgh to Dunfermline West Fife and beyond the North British Railway Company constructed a line to Port Edgar and the West Breakwater was built originally as the southern terminus of the Forth ferry about 1870. With the completion of the Forth bridge in 1890 Port Edgar was required no longer for ferry purposes but it was used as a depot for creosoting railway sleepers until the First World War. The single track was not lifted until the late 60s up to then being used for transport of heavy loads such as minesweeping cable drums.

The first Admiralty settlement in the Port Edgar area was the R.N. Sick Quarters in lower Butlaw Camp which was built in 1904. At the turn of the century however

R.N. Barracks, H.M.S. LOCHINVAR, with the Surgical Theatre, Block 14, in foreground and showing the Forth Road and Railway Bridges in the background.

when the training ship *Caledonia* was moored off the port, the carpenter's crew had a boathouse near the slipway for the repair of ship's boats and other small craft.

In 1913 the Admiralty decided to built a Destroyer Base at Port Edgar capable of taking 36 Destroyers. During the First World War the harbour was purchased and developed for that purpose and the new base was commissioned as *H.M.S. Columbine* in December 1917. It was a common sight during the war to see thousands of libertymen landing at Port Edgar from the ships of the Grand Fleet which spread out at anchor above and below the bridge presented an impressive spectacle.

After the war the base was a boys training establishment for a few years finally closing in 1927. The third last Commanding Officer was Captain A. B. Cunningham who achieved fame in World War II as Commander in Chief Eastern Mediterranean, Commander-in-Chief Mediterranean and finally First Sea Lord.

In 1939 with Hitler on the rampage Port Edgar came to life again. The old Destroyer Barracks were converted to a 200 bed hospital. Work started on the new hospital in 1938 with construction of operating theatre, medical store etc. and with conversion of the Mess decks to wards. This hospital remained open until 1950 when it closed finally. Many Scots wartime naval doctors will remember the R.N. Hospital Port Edgar where they went for medical examination and interview.

The hospital was opened on March 8, 1939 and the first Medical Officer in Charge was Surgeon Captain G. D. D. Fergusson RN. There were 84 surgical beds, 42 medical beds and 35 infectious beds. Later all infectious cases were sent to Edinburgh City Hospital, increasing medical bed capacity to 77. In 1942 two additional wards were added for V.D. and scabies cases. During the war years there were, on average, 4,000 admissions per year. Numbers dropped away rapidly after 1945 and the hospital was closed on April 27, 1950. The last Medical Officer in Charge was Surgeon Captain J. G. Holmes RN.

Hospital records are poor with many large gaps. Apparently war casualties were few. Three German Airmen were treated for

injuries when their aircraft was shot down in the Firth of Forth on October 16 1939. Twenty casualties from a bombed Destroyer were admitted on July 7 1940 An RAF Sergeant was admitted on September 28 1940 suffering from shock and exposure following 3 days in a rubber boat

Bed occupancy was low as a large number of beds had to be kept available for possible casualties Convalescent cases were discharged weekly to R N A H Kingseat Aberdeen by ambulance to Edinburgh train to Aberdeen and ambulance to the hospital When Kingseat was full cases were transferred to R N A H Invergordon or to the civilian E M S Hospital at Bangour West Lothian

Twelve appendicectomies and 12 herniotomies were about average for a quarter Duodenal ulcer seemed to be as great a naval problem then as now On the other hand pulmonary tuberculosis with 44 admissions in 1940 and 124 in 1941 is a reminder of that scourge of the Navy before the days of mass miniature chest X-rays Three cases of diphtheria were admitted in one quarter Who ever sees a case of 'Dip now? One hundred and sixty one cases of scabies were admitted in one quarter Of course we still have scabies but there must be very few admitted to hospital

H M S Lochinvar was commissioned at Port Edgar in November 1939 as a new entry training establishment turning hundreds of civilians into minesweeping sailors rising to a production rate of 300 every fortnight Following the German occupation of Norway numerous Norwegians established themselves in *Lochinvar* They had lecture rooms and accommodation at Port Edgar and the Royal Norwegian Yacht occupied a berth in the harbour Later there was a Belgian section also Among the many minesweepers used for training were several converted paddle steamers One of these was the Duchess of Fife known to many Scots as she sailed the waters of the Firth of Clyde for many years carrying tourists in summer and commuters in winter

In 1943 with the Normandy landings in preparation it was decided to assemble and train Force S in the Forth area This required the temporary eviction of *Lochinvar* from Port Edgar and so in October of that year *Lochinvar* moved to Granton leaving Port Edgar for the newcomers and now renamed *H M S Hopetoun* After Normandy the establishment was used as a school for landing craft crews about 800 Royal Marines being held for training This was part of the work up for the invasion of Japan

H M S Lochinvar returned to Port Edgar on March 1 1946 as a T A S school From 1955 to 1960 the large brick building at Upper Buffalo Port Edgar was the Upper Yardmen Training College *H M S Temeraire*

In 1960 the growing importance attached to mine countermeasures brought the Admiralty decision to make *Lochinvar* once more responsible for all mine countermeasures training This raised many problems most of them concerned with accommodation As a first move the buildings of the former R N Hospital were restored to their original purpose The large wards became mess-decks with about 26

Wardroom H M S LOCHINVAR (Medical and Nursing Sisters Mess 1939 1951)

sleeping billets In 1970 these were partially modernised each mess deck being divided into 4 six bed dormitories The Sick Bay was established in the upper surgical theatre block and the Dental Surgery was established in part of the lower surgical theatre block

In 1962 the task of *Lochinvar* was stabilised to support the operational U K Mine Countermeasures Flotilla including the 1st Minehunting Squadron and the Fishery Protection Squadron at Port Edgar Eventually the 1st Squadron consisted of the Headquarters and Minelaying ship *H M S Abdiel* and 5 Minehunters and the 4th Squadron of 8 Minehunters/sweepers In 1975 2 additional ships joined for oil/gas rigs protection The Commanding Officer *H M S Lochinvar* became also Captain Mine Countermeasures (home) being responsible for all M C M matters in home waters and Adviser to the Admiralty and to Commanders in Chief abroad

In 1962 H M King Olav of Norway paid his state visit to Scotland during which he walked round *Lochinvar* and visited ships of the Scottish Command in Review Order off Port Edgar

In the summer of 1963 *Lochinvar's* M C M ships combined with *Vernon*, Portland Fishery Protection and S R N R sweepers to carry out Operations "Clear Road" based on Esbjerg Denmark and "Cableway" based on Den Helder Holland This task demanded the clearing of channels for G P O cable layers through war-time minefields each channel being 48 miles long and 2 miles wide 26 ships took part

H M S Abdiel H M S Maxton and 2 M C M ships from other squadrons helped to clear the Suez Canal in 1974 In the following year *H M S Abdiel*, *H M S Sheraton* and one other ship took part in the final clearance of the canal culminating in the opening of the canal on June 5 1975

On September 17 1975 all ships based on Port Edgar transferred to Rosyth where the new support base was opened officially on the following day *H M S Lochinvar* closed on October 15 1975

Two Naval Medical Scholars

Cecil Foll

At the end of each Desert Island Discs programme presented by Roy Plomley on the B B C the castaway is asked which book in addition to The Bible Shakespeare and an encyclopaedia he or she would most like to have with them in their solitude For my part this would be a difficult choice between two flower books — Lord Wavell's Other Men's Flowers and Captain Eric Bush's Flowers of the Sea The former is a personal anthology of poetry that from the opening poem Thompson s Hound of Heaven to the author s own concluding Sonnet for the Madonna of the Cherries has been a loved and valued companion for over thirty years, and the latter a very fine anthology of marine literature which should stir the heart of anyone who values the courage and traditions of British seamen Captain Bush V C takes the title from a letter of Admiral the Hon Edward Boscawen written off Brest to his wife in 1756 I hog My Dear will not be uneasy at my staying out so long To be sure I lose the fruits of the earth but then I am gathering the flowers of the sea This quotation brings to mind the names of two Naval doctors who also gathered the flowers of the sea and have written important thought provoking and thoroughly entertaining books Surgeon Vice Admiral Sir Sheldon Dudley Medical Director General of the Royal Navy (1941 46) and most unusually elected F R S whilst a ship's doctor published in 1950 his The Four Pillars of Wisdom and Surgeon Captain T L Cleave formerly Director of Medical Research Institute of Naval Medicine published in 1974 his The Saccharine Disease That their subject matters are in no way connected is evidenced by the sub titles Dudley s being A Rational Approach to a Healthy Education and Cleave s 'Conditions Caused by the Taking of Refined Carbohydrates such as Sugar and White Flour However medicine The Royal Navy originality and a provocative seamanlike approach form a tenuous link between the two

Dudley contends that the absence of organised instruction in logic, psychology statistics and semantics is a universal defect in all general education He reflects on the rarity of independent thought and blames the omnipotence of emotion and wishful thinking in our failure to achieve disinterested reasoning How true this is today in the light of the recent Referendum debates Dudley quotes Herbert Spencer Most men would rather die than think and questions whether free thinking could survive natural selection To this inability to think he adds prestige suggestion hard prejudice and neglect of science to form the four main causes of bad education It must be remembered that the derivation of the word education is *educare* to bring up from childhood (Fowler 1968) and not *educere* to draw out Although the correct meaning has been stressed by Plato Bacon the Jesuits and confirmed experimentally by

Pavlov many modern authors persist in using the second or wrong meaning. This in itself would appear to be sufficient cause for a course of semantics in education

The section on semantics could be studied with benefit by most medical authors — he suggests that in scientific writing it is essential to be rational truthful and fair to eschew emotion and reduce ambiguity to the lowest degree and whole heartedly approves the words of Quiller Couch (1960) on training illiterate scientists Men of science would persuade us that good writing that style was something extrinsic to their subject beneath the notice of their stern and masculine minds Examples about the science of semantics are drawn from far and wide i e rodent officers ping pong parrots Humpty Dumpty Anatole France Aldous Huxley Adler G B Shaw and Dr Johnson to mention but a few Like many good sailors Dudley reserves special treatment for politicians with their contented ignorance about their own powers of language comprehension and concludes that "if we do not laugh at them we can only weep at their inefficiency There is little doubt but that were he alive today he would have included a special paragraph (or even a chapter) on that appalling phrase so beloved of politicians and television commentators at this moment in time" which it is submitted can only mean now

Although Dudley admits that at the time he was writing psychology stressed the study of *behaviour* rather than *introspection* which suggests an academic pastime of saints philosophers and metaphysicians he prefers to retain "mind" in his working definition of psychology He favours Schiller's (1924) writing Psychology aims at describing the nature and phenomena of the mind' and much approves of McDougall's common sense approach In fact the practical old sea dog or common sense view is stressed throughout this section with a marvellously catholic range of examples "the Gilbert Islanders tribal taboo against defaecating above the high water mark (herd instinct) it took two wars before it was respectable for women to wear trousers Instead of encouraging their skirts to get caught in the machinery of the workshops and 'like the uniform of a regiment or the baboon's blue buttocks the old school tie can be used as a recognition signal a panache to rally the clans" (herd fashion) and Surgeon Rear Admiral Beadnell's words a man can be a machine in his laboratory a free agent in everyday life and an immortal soul in church (dissociation) He has a number of side swipes at those who perpetrated the vitamin racket in the Services during the last war fox hunting wealthy Roman Catholics game shooting and suggestions that good athletes cannot have brains and is disappointed by the "myopic book worm Kipling in a moment of athletic inferiority writing "the flannelled fool at the wicket and the muddied oafs in the goal The chapter on religion and psychology is rather an odd mixture but he does admit that he has a self confessed grudge against the priesthood as a profession

Under Statistics Dudley quotes the interesting survey made in the British Medical Journal column "Any Questions?" in which Bevan (1948) analysed the subject matter of 2 018 consecutive questions and found that the least number of questions (0 7%) were asked about statistics suggesting that medical practitioners want to know precious little about statistics! Maybe with the present day accent on community medicine this attitude has changed There are interesting accounts of the logistics of gonorrhoea and malaria in the war time Navy on the ultra violet racket resulting from the belief that all healthy men are slightly sunburnt" on the inverse ratio of drunks to the density of public

honses and on relative barbarity Logic is generally defined as ' the science of the laws of thought and reasoning' but Dudley believes that it could well be 'logic is the science of sciences' and quotes Lord Horder s statement that a primer of logic is the best text book of medicine That Lord Baldwin boasted of being illogical is 'perfectly dreadful' and a symptom of mental deficiency but in a slightly mellower view it is suggested that maybe Baldwin had his own special meaning for the symbol ' logic' Again a vast canvas is sketched with Molière William of Occam Lysenko Trotter the early history of yellow fever and trumpet blowing all depicted

Surgeon Captain Cleave explains in his Preface that the word saccharine meaning related to sugar should be pronounced like the River Rhine so as to distinguish it from the well known chemical sweetener which is pronounced saccharin or 'sachareen' He also stresses that a feature of his thesis is its simplicity and like Dudley adopts the common sense approach As a result, he has produced a fascinating book The author states that This work is based on human evolution and stemming from it the perfect adaptation of all species to their natural environment The essence of the book is that consumption of refined carbohydrate foods has increased enormously during the last century and that such foods are the cause of diabetes coronary disease and obesity peptic ulcer constipation haemorrhoids and varicose veins *E Coli* infections such as appendicitis pyelitis and diverticulitis renal calculi many skin conditions and dental caries These are often called the diseases of Western civilisation

Cleave stresses that the refined carbohydrates mostly sugar and white flour exhibit great alterations from the natural state in that in the former 90 per cent of the sugar beet or sugar cane has been removed and in the latter 30 per cent of the wheat has been removed In about 1800 there started general consumption of white flour in the U K and since that time sugar consumption has risen from about 15 lbs per head per year to about 120 lbs i e an eight fold increase in just over 150 years and this is too short a time for the body to become adapted to the change Basically refining carbohydrates produces harmful effects in three ways by removal of fibre affecting teeth stomach and colon by over consumption due to concentration resulting from removal of fibre and by removal of protein affecting behaviour of the gastric acid These effects cause diseases which can be similarly grouped i e **removal of fibre** — constipation varicose veins deep venous thrombosis haemorrhoids diverticular disease dental caries and in part cancer of the colon **over consumption** — diabetes obesity coronary thrombosis primary *E coli* infections and gallstones **removal of protein** — peptic ulceration In a similar fashion to Dudley Cleave draws upon his experience in The Royal Navy and by 1941 was able to write to the British Medical Journal describing ten years' experience with the taking of natural unprocessed bran It was apparently popular with his sailors as it enabled them to live without purgatives the famous No 9 mixture Each of the diseases mentioned is described in some detail in a distinctive and distinctly dogmatic fashion amusingly admitted by the author and quoted by a reviewer (Stock 1974) The author has sometimes been blamed by his friends for resisting modifications in his concepts The reason for this does not lie he hopes in his getting older these days but in the fact that [he knows best] to paraphrase the ensuing explanation] The absence of these diseases in the third world is stressed and numerous interesting examples are cited Cleave deplores the eating of meals in the absence of hunger which he claims leads to a disjointed action in the stomach and gives

a fascinating account of the absence of peptic ulceration in the Germany Army on the Eastern Front during the Second World War One step which is eminently feasible as a protective measure is to persuade people to eat true wholemeal bread and banish white bread and refined farinaceous products from hospitals public institutions and indeed from all homes Sir Richard Doll in a foreword to an earlier joint work of Cleave's suggested that if only a small part of their predictions proved to be correct the authors will have made a bigger contribution to medicine than most university departments or medical research units make in the course of a generation Perhaps the most important aspect of Cleave's work is the stimulus that he has given others to carry out further surveys and investigations notably those by D P Burkitt and K Heaton and the enormous general interest that was reflected in a recent Horizon programme on the B B C

Both these Naval doctors have written books which should make us think anew about our education system particularly in respect of medical education and also our eating habits Certainly no one could argue against including both semantics and statistics in the medical curriculum and psychology is already included however in my student days the course consisted of a few spasmodically attended lectures and a visit or two to an asylum Although Dudley says that medical students at Salerno (founded in AD 900) studied logic intensively for the first three years of the course it now appears to have largely disappeared from the medical school curriculum but as Dudley goes on to suggest "Ignorance of logic may be an asset in *artistic* medicine yet there is no doubt *scientific* medicine is not going far without the aid of logic" If there is a chance of avoiding or reducing the incidence of the all too common diseases of Western civilisation then by all means Cleave's concept must be investigated with alacrity and diligence These two books or "Flowers of the sea" should make many scientists realise that they may well be (as Dudley admits he once was) in that condition so aptly described in The Royal Navy on the lower deck as "full of confidence and bloody ignorance"

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Codding — or comment upon an article relevant to Maritime Medicine

Peter Preston

It is a matter of some interest to read in 1975 the article by Dr Blade, Consultant Ophthalmologist at the Military Medical School in Brest Some in the Royal Naval Medical Service may be interested to know that since the last war medical support and assistance to the deep sea fishing fleets of France has been provided by the French Navy Sickbaymen doctors and dentists are embarked aboard middle sized warships to support fishing fleets as far away as Newfoundland and the North Sea

Few details are given of the equipment taken to sea but the principle appears to be a basic medical chest supplemented by dental, anaesthetic, pathological surgical fracture and perfusion chests according to the expertise of the medical personnel embarked This and the problems of practising effective medicine at sea in the confined quarters of a warship sound very similar to those that exercise the Royal Naval Medical Service One can only imagine that here we have something to learn from each other

One of the most interesting sections in this article is that on medical consultation and the provision of advice by radio to masters of fishing vessels at sea French Naval medical assistance is constantly available by radio from warships within reasonable reach of the fishing fleets As with British merchant and fishing vessels there is some statutory medical equipment on board and it is essential for the doctor giving advice over the radio to know the scale of this equipment available in any particular vessel

It is emphasised that to be effective such a radio consultation requires the doctor to know something of the men with whom he is dealing the working conditions and something of the sea itself What is not mentioned is the demands consultation under such circumstances make upon a doctor who, in consequence of his training, has a deep antipathy to assuming responsibility for a patient whom he has not examined himself In truth the doctor must in this situation take responsibility for a patient who has been examined only by a layman with limited medical knowledge and who is often in any case pre occupied by his own duties on board Small wonder that sleep comes much less easily after a night time call to such a consultation than it does after being woken to see a patient one can examine and treat oneself

This article gives a useful one page guide for such consultations for the use of trawler captains which include a simple guide to history taking, an anatomical grid to which wounds and pain can be localised with small sections of essential questions on accidents wounds localised symptoms of hands legs chest abdomen, eyes and throat My impression is that this simple guidance sheet could, with advantage be inserted into the English, Ship Captains Medical Guide which is carried by all British merchant ships and held by all doctors and hospitals ashore concerned with

giving advice by radio

Both the Ship Captains Medical Guide and this article emphasise that what is required of the doctor giving advice is

An ability to imagine the state of the patient the surroundings and the state of the sea

An appreciation of the ship s position relative to various sources of assistance and some knowledge of the vagaries of radio communications Above all an ability to weigh up the clinical situation and to give clear and positive advice within the competence of the master and the supplies available to him and on the understanding that ultimately the master must act on his own responsibility The doctor advises in the hope that by so doing he can lift some of the burden of responsibility from the shoulders of a hard pressed trawler skipper

This task of giving radio advice is no easy one as the staff of RN Hospital Plymouth has learnt since last August when it became a support hospital to the UK radio station at Portishead which has a world wide coverage by radio telegraphy

During the remaining months of 1975 some forty cases were treated at sea by this means from the casualty department often involving an appropriate Consultant Indeed the management of a threatened abortion at sea by a Royal Naval Consultant Gynaecologist seemed to block the ether for days- Happily the outcome was eventually successful Cases have been so frequent and the problems presented so interesting that a research project is in process of development with a view to improving the technique of such consultations

Dr Blade gives some space to the question of evacuation of patients from trawlers at sea Here with respect, one would suggest more detail is required by both seaman and doctor if evacuation is to be managed with safety particularly when helicopters are used It must be remembered however that the purpose of the article is to draw attention in broad terms to the service given to the trawler fleet by the French Navy

It is clear that the French view differs somewhat from that of the Royal Navy Warships are detached for the duty of supporting the fishing fleet and are then complemented with medical personnel to perform this humanitarian function This assistance includes in addition to protection in respect of international regulations distribution of mail and messages revictualling and responsibility for survival at sea

The French deep sea fisherman has had the right to this support — since the end of the last war!

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LETTERS TO THE EDITOR

Sir

As a final year Medical Cadet I read Surgeon Captain Wheldon's letter in your recent edition with interest May I as a very junior member of the Service make three points on this subject

1 The NHS will almost certainly remain the largest source of medical employment in this country for some considerable time to come It is becoming increasingly 'diploma conscious' and certainly in this part of the country postgraduate education programmes are being pursued with considerable vigour by all concerned (perhaps rather more than the Naval Powers That Be care to realize) It follows that if I and my ilk are to have a reasonable choice of career at the end of our five year's service provision must be made to ensure that our postgraduate training is up to the mark If it is not the Service will be lumped with a large number of disgruntled and frustrated doctors and recruiting will not just get worse it will to all intents and purposes cease

2 For its many faults a diploma represents a reasonable objective measure of professional competence We forget this to the detriment of our professional credibility Even with only average doctors we have no excuse for not being as good as average NHS Why therefore should we be scared of their standards?

3 It would seem to me that a lot of the expertise of the 'scrubdeck' doctor should lie in the field of emergency medicine — something surprisingly often forgotten in the Age of the Motor Car (I suppose the truth of the matter is that R T A victims are not much good for vivas) Does the Navy treat this aspect of medicine as seriously as it should?

In a field of knowledge advancing as rapidly as that of Medicine considerable changes in technique must occur within the working lifetime of any single practitioner however conservative Obviously we must try to see the wood not just the trees but at the same time we are members not only of the Royal Navy but also the medical profession at large and we cannot afford to ignore such developments as may occur

I am etc

S J Townsend

Surgeon Sub Lieutenant Royal Navy
Newcastle upon Tyne

Surgeon Sub Lieutenant Townsend need have no fear on the score of postgraduate education Every opportunity is afforded naval medical officers to acquire postgraduate degrees and he may be

interested to know that the only Service hospitals to receive approval for Higher Surgical Training from the Joint Committee on Higher Surgical Training are the Royal Naval Hospitals at Haslar and Plymouth

Editor

Sir

I agree in the main with Surgeon Captain Wheldon's letter (JRNMS Vol 61 3) I am sure though that the comment about brilliant doctors was meant slightly differently of course the Service possesses doctors of high academic calibre and needs them but it will never need for instance a surfeit of brain surgeons I agree too, Sir that we live in a world dominated by the gods of academe even dustbin men have become refuse collectors of various grades and it will not be long before they are sent away for management courses or to sit the Dip Ref Coll It will not make them better dustbin men

I only joined the Navy a year ago so please accept my comments in that light However I qualified over ten years ago initially spending three years in hospitals doing Casualty and Surgery General Medicine Obstetrics Infectious Diseases and Haematology Bacteriology and Morbid Anatomy During the following six years I did all my own Obstetrics in a GP/Consultant Maternity Unit and was also the Assistant Pathologist and the Acting Medical Registrar at the local hospital I was an active member of a County Accident and Emergency Scheme dealing mainly with road accidents and involving Disaster Organisation Casualty Simulation and First Aid Training For none of this am I the proud possessor of a Diploma I am a member of the Royal College of General Practitioners and, therefore specialised and thus able to become a GP Trainer

While I thus feel that my extra qualifications are important and some may argue necessary far more important to me is my experience and as a naval medical officer a positive attitude to naval medicine in general If overspecialisation is harming the Navy it is because the emphasis is on training doctors to go out not to stay in If as it seems we must lend some support to the National Health Service let us do it by providing General Practice and basic Hospital facilities to all wives and children at home as well as abroad and mould naval doctors to suit the circumstances rather than altering the circumstances to promote multiple diplomatosis

I am too young to be cynical, and remain too well adjusted to be paranoid and thus look forward to a general duties career in the Navy confident that over specialisation will not overrun us all in the end

I am etc

Kenneth H Sugars

Surgeon Lieutenant Commander Royal Navy

Senior Medical Officer, HMS *Norfolk*

BOOK REVIEWS

DISASTER PLANNING: Proceedings of a Symposium held at the Royal Naval Hospital Haslar. Edited by Surgeon Commander I. W. Richardson OBE, FRCS RN. Pp 144. Bristol: John Wright & Sons. £5.00.

This excellent cloth-covered book is a detailed account of the above symposium held at RNH Haslar on October 10 and 11, 1974. The symposium was divided into three parts (i) the problem (ii) site organisation and (iii) hospital organisation.

Although in its long history the Royal Navy has been involved in national disasters in many areas, this is the first time I think that the Service has drawn together all the services and organisations concerned in major civil disasters. Surgeon Commander Richardson is to be congratulated in attracting such a wealth of talent and experience to his symposium.

The subjects covered include Air, Maritime, Railway, Road Traffic and Nuclear accidents, including problems such as major fires, civil disturbances and detailed advice on the control at the scene of the disaster, rescue and release, reorganisation of casualties and medical care at the site.

A whole section also covers transportation of casualties by road, air, helicopter and the role of the voluntary services.

The final part concerns the organisation of designated hospitals, reception and treatment of casualties, staff problems, medical supplies and documentation, the latter of course covering the Haslar Emergency Casualty Plan (HASCAP).

It struck me early on in reading the papers given at this symposium that there is an urgent need in this country for a National Plan for major disasters. Such a plan is envisaged by one of the final speakers but in my mind this needs considerable government support and organisation if such a plan can work effectively and at short notice. The many regional, local, county, city and even local county council services cooperate in these situations and perform to the best of their ability with often inadequate equipment and unimplemented overall control. The need for a National Disaster Agency with money and resources is urgently needed and this symposium to my mind made this very clear, particularly when one reads the various and often conflicting views made during the discussion periods.

Surgeon Commander Richardson has no hesitation in bringing all these conflicting views to light. It is to be hoped that these views are impressed on Central Government at the right quarter although during the present financial stringency it may be difficult to give a National Disaster Plan effective teeth.

One serious omission in my opinion — I would have liked a 'Check List for Disaster' if this was possible. This would have been a very useful aid to the medical officer or medical agency suddenly finding himself or itself the central of a major disaster incident. In such instances there is no time, or opportunity to wade through a publication for necessary points of guidance. However, to be fair this was not the purpose of these proceedings.

F. S. PRESTON

ANATOMY AND PHYSIOLOGY FOR NURSES
Evelyn C. Pearson. Pp 391. London: Faber. £1.75.

This compact readable paperback book is intended for students studying the New Syllabuses of the General Nursing Council. Fitting easily into a coat pocket it makes an ideal travelling reference.

Containing of 26 chapters (in which the text is amply illustrated by clear black and white diagrams) it also includes a Glossary of Eponyms (Anatomical Terms carrying the name of the physician or surgeon whose work was associated with the term). Each chapter is completed by a section on Clinical Notes giving the basic details of the common conditions in which the chapter knowledge is applied.

In the attempt to explain the basic concepts of the more complex systems such as the Cerebro Spinal Nervous System (Ch. 22 page 327) it may have helped if terms such as spasticity and rigidity were clearly explained and related to lesions of the Pyramidal and Extrapyramidal systems rather than appearing together as on page 358 following Spinal Cord Lesions. The same criticism applies to the use of the term Nerve Synapse (p. 351) when describing a synapse between Neurones. This wide interpretation of the description of a synapse could lead to a misunderstanding of the formation of a peripheral nerve and the structure, location and function of synapses.

Despite these minor criticisms student nurses who require to revise their knowledge of Anatomy and Physiology should find this new edition most useful in their studies.

G.J.

An example of the cordial relations which exist between the Royal Navy medical officers and medical officers of the French Armed Forces is afforded by the following review submitted for publication by Medecin en Chef Pierre Nouassal, Sous directeur of the Centre

de Recherches du Service de Sante des Armees Editor

DISEASES AND HISTORY by Dr Frederick F Cartwright and Michael D Biddiss Vol I 1972 Hart Davis MacGibbon Ltd London and the French edition 'CES MALADIES QUI ONT CHANGÉ L'HISTOIRE' translated by Jacques Poitin (Vol 1) Pp 240 Elsevier-Sequoia Paris-Bruxelles £2 50

It is perhaps of some interest to the doctors and officers of the Royal Naval Medical Service not only to know of the existence of a French translation of the very interesting book by Drs Cartwright and Biddiss Ces maladies qui ont change l'histoire originally published in English under the title Diseases and History but also to hear an echo of some pleasant correspondence which was exchanged at the time of this book's appearance in France between the author himself formerly Head of the Department of Anaesthesiology at King's College and now Head of the History of Medicine Department of the same College and one of his French readers.

Dr Cartwright's book gave rise to the following analyse in the magazine of the Health Service of the French Armed Forces Medecin et Armees No 7 Vol 3 1975

Historical epidemiology has many facets and it is natural that one should approach slightly differently for example the social medical evolution of Africa depending on whether the medical history is being considered from a French or an English point of view

Such distinctions are superficial and relatively unimportant nagana remains nagana and the filaria lawae no nationality This book is pleasant translation of the English book Diseases and History is excellent and will no doubt interest a great many French medical readers especially amongst Army and Navy doctors who are aware that the disinclination of several African savages can mainly be ascribed to the missing efforts of their predecessors

The paucity of references in the book to these French medical achievements may well come as a surprise to the French reader The same applies to the subject of exanthematous typhus where there is a total absence of references to the great epidemiological studies in naval circles

In this regard long principle epidemics are recognised the consequences of which are undisputed these are the typhus epidemics in which the French squadrons were subject in 1745 1746 1757 and 1779

It is thus probable that Louisbourg's fate and that of the whole of Canada would not have been the same had Du Monsieur du Bois de la Motte Squadron not been the victim in 1757 of such a massive epidemic of ship fever that they could only drag themselves across the ocean to return to Brest where they disembarked 4 000 moribund men Certain medical historians have depicted the eighteenth century as the century of exanthematous typhus These episodes would seem to confirm this view

Another surprising aspect of this book is its bibliographic references mainly consisting of books in the French language or by French speaking authors True is very unusual for a book of Anglo-Saxon origin but it is of course possible that the bibliography given in the French edition is a part of a much longer list of books which appeared only in the English edition

The general of this interesting book indicates that it is written more from the viewpoint of a medical sociologist than that of a strict historian

The fact that the bibliography in the French edition was composed mainly of French references seemed strange enough to the present reviewer to make him wish for some enlightenment on the subject from Dr Cartwright The letter very kindly replied that the bibliography of the British edition was completely different

It is of course possible that the references of the French edition were especially selected by the French translator to make things easier for Continental readers

In addition it would seem that the most interesting point with regard to the subject treated in this book is the contrast between the French and British points of view regarding the widespread epidemics in naval circles during the 18th century Dr Cartwright is of the opinion that during the Canadian campaign the main epidemic infection was smallpox Medical historians of the French Navy however and in particular Medecin Général Carée have demonstrated the major role of typhus at least in the French squadrons It would seem that Dr Cartwright concedes that these points of view are complementary

These investigations are still necessary in order to define more accurately these interesting problems and then analyses and in this regard it has seemed worth while imparting the exchange of medical opinions relating to a part of history which is common to both nations the interest and importance of which is brought out by the two editions British and French of Diseases and History

P M NIAUSSAT

HOSPITAL SHIPS AND AMBULANCE TRAINS. John H Pinnridge Pp 203 London Seeley Service & Co £6 95

The author enlisted into the RAMC in 1912 and served in the ranks for 26 years working particularly in ambulance trains at home and abroad during World War I Subsequently he was commissioned and eventually retired in 1954 as a Lieutenant Colonel

The main aim of the book is to tell the story of the transport of the sick and wounded of the British armed forces by sea and air — two forms of medical transport which were complementary to one another and which served the British armed forces so faithfully until rendered obsolete by CASEVAC

The book has been well researched well written and beautifully illustrated this and inflation account for its price which at first sight is a bit of a shock Nevertheless there can be no doubt that the work will be of immense interest not only to the Medical Services of the Army but also to past and present members of the Royal Naval Medical Service dealing as it does with such matters as naval hospital ships before 1918 naval and military hospital ships and carriers in World War II and in particular with HMHS Maine The book is strongly recommended and cannot fail to revive nostalgic memories

P D G P

BURNS AND THEIR TREATMENT I F K Mafi and T L Barclay Second edition Pp 179 + xi with 45 illustrations London Lloyd Luke (Medical Books) Ltd £3 50

Fire remains one of the more serious hazards of a

seasoning [illegible] required at any time, [illegible] resulting from a medical or surgical [illegible] This small book will prove to him which [illegible] know for it is essentially a practical [illegible] management of the burned patient based on the joint experience of two distinguished authors which has enabled them to encompass the many facets of a critically complex problem with commendable clarity and objectivity. Mr Jim Mint served until recently in the Royal Naval Reserve and his views are well known to naval surgeons who have followed them with profit

The authors give a succinct appraisal of the complicated problem of burns shock which provides their rationale for treatment There is a good review of the continuing controversy regarding fluid replacement in the initial phase and the authors comment clearly in favour of an adequate protein containing fluid to replace lost plasma in practice generally followed in the Royal Navy The value of this section is greatly enhanced by illustrative charts including a probability of recovery based upon Hall's grid and an excellent summary of treatment at the end of the chapter which should prove of the utmost value in the hurried surgeon Following detailed attention to the local treatment of the burn wound and the general care of burned patients there are two useful chapters on burns of special areas and of special types which abound in valuable practical observations For instance there is a timely warning on avoidable complications and excellent sections on burns of the eye and hands

The only criticism which might be levelled is of the opening chapter which suffers from inadequate standard data and the limited pattern of extrapolating experiences from specialised units of differing dimension to this country as a whole To be fair this is a particularly difficult problem as the burns field and in no way detracts from the value of the book which is supported by an extensive bibliography at the end of each chapter Every naval surgeon would be advised to have his own copy

J W

A MANUAL OF ADVERSE DRUG INTERACTIONS J F Griffin and F F D Avey Pp 347 John Wright & Sons Ltd Bristol Paperback edition £7 00

In an age when polypharmacy or at least multiple drug therapy is the rule rather than the exception in patient management this book serves a timely and much needed reminder of the hazards of drug interaction It is estimated by various authorities that adverse drug reactions occur in 10-25% of all patients A significant proportion of these may be attributed to drug interaction The activity of a drug may be inhibited leading to diminished bio activity or enhanced giving an effect an overdose by the presence of another incompatible drug ingested in food

This book is divided into two parts Part I occupies the first 50 pages and gives an excellent account and examples of the possible mechanisms involved in drug interactions The administration of drugs in in vitro combinations the interactions of drugs and diet affecting absorption from the gastro intestinal tract the competition at receptor sites the modified enzyme induction and finally the influence of drugs on excretory systems are fully discussed Of particular value to hospital staff is the section devoted to undesirable consequences of indiscriminate intravenous infusion fluid Gone is the days as to which drugs may safely be given in which infusion fluids are clearly laid down

Part II is for reference purposes and is the major part of the book Each main group of drugs is dealt with in turn in alphabetical order A brief summary of their actions uses and adverse reactions is given followed by detailed lists of possible drug interaction and recommended treatment Ample references to the literature and a comprehensive index make this a most valuable hand book for the hospital ward consulting room or surgery desk

An interesting and enlightening exercise of any doctor would be to review his patients and their current therapy with drug interaction in mind A stringent modification of prescribing habits and a greater awareness of the potential danger in the pen poised over prescription pad would surely result and give the authors of this book some measure of reward for the undoubted care and thorough research taken in compiling it

A R M

LECTURE NOTES ON GENERAL SURGERY TROPICAL SUPPLEMENT Dongley Roy Pp 74 Blackwell Scientific Publications £2 75

The cover implies that this text is to be read in conjunction with Lecture Notes on General Surgery This reader is a physician with an interest in tropical medicine has yet to meet a surgical trainee who would be intellectually satisfied with the contents Eighteen lines on Malaria will hardly enlighten any doctor in the tropics for alone a surgeon not will it help any hopes any malnutrition malaria in this country

In fairness it must be said that this introduction states that it is hoped that it will provide a suitable introduction to the practice of surgery in tropical countries for undergraduates who have read any standard text book In this instance the student doing an attachment in Africa might gain some hints relevant to his area of activity it is to be hoped however that such a student would pursue his studies of cases seen in practice to a much greater depth than is here presented Sadly there is no guidance here for a student seeking further information from the literature this is a major defect

F J F

ROXBURGH'S COMMON SKIN DISEASES 14th edition Pp 472 Revised by Peter Borrie London H K Lewis & Co Ltd £6 00

Dermatology has undergone considerable progress even the 8 years since Dr Peter Borrie last revised this popular volume and it is therefore somewhat surprising that so few changes have been made The decision to omit the chapter on Therapeutic Principles is questionable as this area is poorly covered by most of the book's competitors In the relevant sections simple proprietary ointment preparations are not emphasised as alternatives to the many unfamiliar ointment mixtures which would certainly stretch the pharmaceutical capabilities of the general practitioner Officer and the memories of most General Practitioners The use of X rays in the treatment of benign dermatoses has a very limited place in the modern therapeutic armamentarium but radiotherapy continues to be quoted for the management of chronic eczema and pruritus and not vulvae to mention but three

[illegible] Much of the fi[illegible] Immunes seem [illegible] to a small [illegible] book and might have been abbrev[illegible] few sentences on less common [illegible] such as peripheral [illegible] pigmentation and exp[illegible] cutaneous manifestations [illegible] academic of such subjects [illegible] valuable to the MRCP [illegible] be wholly examined [illegible] of sarcoidosis on the [illegible] the phaeochromocytoma [illegible] descriptive term for cutaneous alopecia in this rather misleading approach [illegible] examples of the [illegible] however [illegible] the book represents a very [illegible] introduction to Dermatology. Cross-reference are effectively utilized and excellent accounts of differential diagnosis [illegible] each section. Coloured photographs are well reproduced and generally comprehensive.

The most interesting chapter in Psychiatry deals with Epileptic abuse of Fugue in Bipolar.

At £6.00 the book represents reasonable value although a cheaper, second hand market in certain textbooks can be envisaged among medical students particularly when the relatively limited revision is realised.

M D C

PRACTICAL MEDICINE — A GUIDE TO OUTPATIENT MANAGEMENT By P R Dagg and D M Geddes pp 192. Lloyd Luke (Medical Books) Limited. Price £3.50

This new 292 page volume sets out to [illegible] a map in hands on practical medical management. Dr Dagg and Dr D. [illegible] have named the book at three specialist [illegible] to [illegible] examination in candidates both in the [illegible] exam and in the MRCP panel hospital [illegible] in taking their first out patients and general practice [illegible] who such to investigate their own patients [illegible].

The book [illegible] is very comprehensive for its size and the [illegible] chapters cover the basic medicine cardiology [illegible] endocrinology haematology gastroenterology [illegible] diseases and neurology. Each chapter [illegible] (SIB) opens including such problems as [illegible] health [illegible] pulmonary sarcoidosis [illegible] and [illegible] disturbances.

A list of abbreviations at the beginning of the book [illegible] pharmacological and American drug names. There [illegible] a table of conversion factors for SI units. In [illegible] and full range of haematological values would be a [illegible] more valuable than the abbreviations [illegible] glossary. The contents are well tabulated [illegible] the index is important in most books of this [illegible].

Contemporary [illegible] and [illegible] terminology and phraseology [illegible] in particular the use of [illegible] and such words as tranquillo sedatives.

The differential diagnosis [illegible] ranging and the investigations [illegible] are comprehensive. Where [illegible] for further investigation [illegible] in cardiac surgery is thought necessary [illegible] medical aids. This makes the book delightfully free from pedantic dogmatism and this dogmatism approach [illegible] admitted by the authors in their preface. It has enabled them to produce a concise and useful guide to outpatient management which I hope will be appreciated by those groups of doctors at which it is aimed. It could usefully be read by the Consultants who will appreciate what management is being done in the name **K B H**

PUBLICATIONS BY RN MEDICAL OFFICERS — ABSTRACTS

ELLIOTT D H & HANSON R de G (1975) Treatment of the Drying Cyanotic Anoxic Attack 31 81 89

In a drying cyanotic anoxic attack special conditions are possible in addition to those which could only rarely be considered in a life threatening ritual. There are many separate factors which may be taken into account by some anticipated combination of circumstances towards death in such a fit but not always by drowning.

The ritual is an integral category of accidents are those resulting from the descent of the dam to infance. These must be considered as medical emergencies and the majority respond to immediate recompression. In the absence of readily available recompression facilities valid measures may be adopted the condition pending transfer to a suitable compression chamber.

SERVICE NEWS

OBITUARIES

SURGEON REAR ADMIRAL F G HUNT CB CBE QHP died on October 13 1975 at the age of 81.

Frederick George Hunt qualified MB BCh BAO at the National University of Ireland in 1917 and joined the Royal Navy as a Temporary Surgeon Lieutenant in December 1918 and was soon after. He was promoted Surgeon Lieutenant Commander in December 1923 Surgeon Commander in December 1929 Surgeon Captain in June 1943 and Surgeon Rear Admiral in 1949.

During the First World War Admiral Hunt served in RN Hospital Chatham and in HMS *Malta* and *Queen*.

In July 1933 he was appointed Specialist in Anaesthetics and in July 1939 as Specialist in Medicine.

During the Second World War he served in RN Hospital Chatham Medical Department Admiralty and HM Hospital Ship *Tjitjalengkat*.

On promotion to Surgeon Rear Admiral he was appointed MOIC RN Hospital Haslar and Commandant Medical Officer on the Staff of C in C Portsmouth.

Admiral Hunt was awarded the CBE in the Birthday Honours of 1948 and in June of the same year was promoted to the Venerable Order of the Hospital of St John of Jerusalem as Officer (Brother). In Feb 1949 he was appointed KHP and CB in the New Years Honours 1952.

Admiral Hunt was placed on the Retired List on November 6 1952.

SURGEON REAR ADMIRAL L WARREN OBE BS MRCS LRCP died on January 4 1976 at the age of 95 years. He was born on September 10 1880 and served in the Royal Naval Medical Service from 1906 to 1939 being recalled for Service during the Second World War from 1939 to 1946.

An appreciation of the career of Admiral Warren and his naval career would be welcomed by the Editor.

HONOURS & AWARDS

New Year Honours 1976

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Surgeon Captain P W Head *OBE*
Surgeon Captain R V Jones *QHS*

HIGHER QUALIFICATIONS

Surgeon Commander A C Chakravarty — MChOrth (Liverpool) December 1974

Surgeon Commander M A Maxwell — MD (Edin)

Surgeon Lieut Commander A H Osborne — FRCS (Edin) FRCS (Eng)

Surgeon Lieut Commander P I Sull — FFARCS(I) FFARCS (Eng.)

Surgeon Lieut Commander S B Merrill — DA

Surgeon Lieut Commander (D) S R Dey — FDS RCS (Eng)

Surgeon Lieut Commander P R Brinsden — MRCOG

Surgeon Lieutenant D J Luck — DA

Surgeon Lieutenant D J Robinson — DA

CATEGORY A2 FLYING INSTRUCTOR AWARD

An award made to Surgeon Lieutenant Commander A P Sneh Perkins on December 12 1975. This was the first occasion on which a naval medical officer had reached the top grade of flying instructor. His experience will enable him to make important contributions to the analysis of human factors in high performance aircraft and to the development of human [illegible]

[illegible]

APPOINTMENTS

Professor of Naval Medicine

Surgeon Commodore C J Milton Thompson FRCP

Director of Environmental Medicine

Surgeon Captain J Keeling MRCS LRCP

Director of Surgical Research

Surgeon Captain N J Blackbeck OBE FRCS

Surgical Tutors

Surgeon Captain J W Richardson OBE FRCS — RNH Plymouth

Surgeon Commander J R Drinkwater FRCS — RNH Haslar

PROMOTIONS

To Surgeon Lieutenant Commander R M Page H P Goodman R T Jolly R N M Gray A H Rodrick M A White.

To Surgeon Lieutenant Commander (D) G W Meers J G Iles J W Tuplin

To Surgeon Lieutenant R I Riddell M C Page D K Price J E M Fox J C D Thomas

To Surgeon Lieutenant (D) G H Rhimes D C C Alexander

To Acting Surgeon Lieutenant C I Bristrode C I V Fenton A R P Graham

Provisional selections for promotion to date June 30 1976

To Surgeon Captain H R T A McLeod G J Milton Thompson P C Fulford

To Surgeon Commodore J J Nicholas J R Harrison R D Kirkpatrick

To Surgeon Captain (D) C T Stacey

To Surgeon Commander (D) M R G Holmes G H A Ridge

NEW ENTRIES

Surgeon Lieutenant R J B Wingate

Surgeon Sub Lieutenant A S C Allison T W F Banks M P Hood P Litchfield S Quinton J W Turvill M L Cowley

Surgeon Sub Lieutenant (D) A T Havard R J Lowthby S R Radham R A Roch M F Sostock

TRANSFERRED TO PERMANENT LIST

Surgeon Lieutenant Commander (D) W R Lock

Surgeon Lieutenant T H Shepherd

Surgeon Lieutenant (D) B J Griffiths A E Shepherd

TRANSFERRED TO 16 YEAR PENSIONABLE COMMISSION

Surgeon Lieutenant I M McEwan

RELEASED FROM SHORT SERVICE COMMISSION

Surgeon Lieutenant Commander D J Luck C P Ashby W J Scadden H P Goodman D S Forsyth
Surgeon Lieutenant P H Jones G M Kyle M A White
Surgeon Lieutenant (D) R J Da F R King

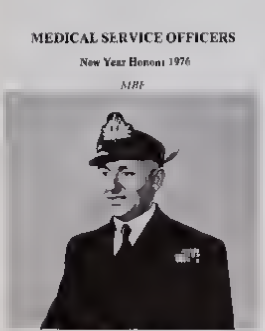
RETIREMENTS

Surgeon Commander R P O'Byrne (with rank of Surgeon Captain (Hon))
Surgeon Commander P G Harries
Surgeon Commander D H Morgan
Surgeon Commander K H McCrath

MEDICAL SERVICE OFFICERS

New Year Honors 1976

MBE



Lieutenant Commander (MS) H J Da

Promotions

To Acting Sub Lieutenant (MS) N Mc

Retirement

Commander (MS) T R Clarkson OBE

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

New Year's Honours 1976

Miss R Stone Principal Matron — RRC
Miss J Ward Superintending Sister — ARRC
Miss Y B McKennell Superintending Sister — ARRC

Promotion

To Major Mrs I R Orr
To Superintending Sister Miss K J A
H E J Gillespie

Re Entry

Senior Nursing Sister Miss M P

New Entries

Senior Nursing Sister A R Wilkinson C I Francis
Nursing Sister S M H C L Smith M M E J E Sutler

Transferred to Permanent List

Senior Nursing Sister C M Pool S F Murrin

Retirement

Miss J Wat Chief Superintending Sister

ROYAL NAVAL RESERVE

Queen's Honours Dental Surgeons

Surgeon Captain (D) M N Nat RD

Promotions

To Surgeon Lieutenant Commander M E W R J C L C F Jackson M G Britt

Retirements

Surgeon Captain J R Roberts
Surgeon Lieutenant Commander G M Maddison

CIVILIAN CONSULTANTS TO THE ROYAL NAVY — APPOINTMENTS

Professor G R Hervey — Physiology
Dr B E Kendall — Neuroradiology
Professor P J Lawther — Environmental Medicine
Dr G Jackson Rees — Anaesthetics
Dr G Sheers — Diseases of the Chest

RETIRED OFFICERS

Surgeon Captain (D) D L Goodridge obtained a BA in Social Studies from the Open University 1976 some 40 years after his initial qualification. Captain Goodridge is at present Dean of the School of Dental Hygiene of the University of Wales Dental School Cardiff

VISIT TO INSTITUTE OF NAVAL MEDICINE KIEL

FIRST AIDERS

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Royal Naval Medical Service

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FRONTISPIECE HMS Scylla off Iceland March 1976

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D Gwynne James MA MD(Cantab) FRCP(L) Honorary Consultant to the Royal Navy Dean Royal Naval Medical School [illegible]

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HMS Scylla off Iceland — March 1976

Editorial

"Were you in the War, daddy?" is a question from their inquisitive children that few serving naval medical officers have been able to answer that is until recently Events in Icelandic waters have now ensured that this question can be answered with veracity and unaverted gaze even if the reply is accompanied by the self-deprecating comment that it was only a Cod War"

Leaving aside the broader questions that such enterprises raise the fact remains that the latest in the series of the so called Cod Wars has involved much of the Royal Navy and the Royal Fleet Auxiliary Service in a role that demands the ability to operate in the most unfriendly and difficult of climes The support required for this operation is complex and rightly involves the Royal Naval Medical Service

To ignore the fact that such support has considerably stretched the Medical Services would be wrong but it must be emphasised that our role must primarily be to provide such support Further the rest of the Navy has gained much in expertise and experience during these past few months and it is therefore right to ask what if anything has the Royal Naval Medical Service similarly gained? There may still be some serving medical officers with experience of Arctic waters during the last real war and who survived the often appalling rigours of convoys to Russia They know only too well how much experience then and subsequently has led to vastly improved equipment and comfort for cold weather operations

And yet we can still learn and it is only by experience observation and reporting that improvements in cold weather clothing performance of men in physically stressful situations the provision of medical equipment and personnel designed and trained to ensure the optimum degree of illness or injury at sea can be achieved

In short the message must be that any medical officer serving on an Iceland patrol should use the experience to endeavour that a Blue Nose Certificate is not the only thing of value which accompanies him when he returns to harbour

Defence Systems of the Body, Immunosuppression and Immunotherapy.

D Gerraint James

Part 1

DEFENCE SYSTEMS OF THE BODY

SUMMARY

There are two principal defence systems of the body namely cellular and humoral immunity Cellular immunity is served by thymus mediated T cells and humoral immunity by B cells of the plasma series Their structure and function are compared and contrasted (Table 1) T cells do not synthesise antibody but on contact with invading antigen they release chemical mediators termed lymphokines which may induce inflammation and cytotoxicity B cells produce various antibody immunoglobulins with differing structure and function (Table 3) T and B cells are involved in one or other of six distinct mechanisms which lead to pathological changes in involved tissues and to characteristic clinical disorders (Table 4 Figs 1-6)

The HLA system is described and associations between particular specificities and clinical disorders are outlined (Table 5)

Introduction

The integrity of the two principal defence systems of the body namely cellular and humoral immunity can be assessed by crude bedside techniques and also by more fastidious laboratory tests of two populations of circulating lymphocytes — the thymus mediated T cells and the bursa of Fabricius B cells There are several differences between T and B cells (Table 1) but it is important that the clinician should remember one that may be crucial to an understanding of immunopathology T cells do not synthesise antibody to any significant extent but on contact with antigen they release various nonspecific substances termed lymphokines, which may induce inflammation cytotoxicity and cell death On the other hand B cells are antibody producing and the various antibody immunoglobulins may be demonstrated on their surfaces

Cellular Immunity

Thymus mediated T cells are responsible for cell mediated immunity and mount delayed type hypersensitivity responses On contact with antigen they release various nonspecific lymphokines They carry memory they reject grafts they recognise cancer and they prevent virus infections They also play a part in controlling B cells and some of them can regulate and switch off immune responses

Impairment of cellular immunity is revealed by depression of delayed type hypersensitivity using a variety of skin test antigens including tuberculin pertussis trichophytin oidiomycin mumps pine

Table 1

A comparison of the Thymus-Mediated T Cell and the Bursa-Dependent B Cell

FEATURES	T CELL	B CELL
BIRTHPLACE	BONE MARROW	
TRIGGER	THYMUS	BURSA OF FABRICIUS PEYER S PATCHES
LIFESPAN	MONTHS/YEARS	DAYS/WEEKS
RECIRCULATION	MAJORITY	MINORITY
SURFACE	THETA ANTIGEN	IMMUNOGLOBULINS
SITED IN - LYMPH NODE SPLENIC PULP PEYER S PATCHES	 CORTEX PERIFOLLICULAR WHITE PERIFOLLICULAR	 MEDULLA GERMINAL CENTRE RED CENTRAL FOLLICLE
DIFFERENTIATE BY	SKIN TESTS TUBERCULIN DINITROCHLOROBENZENE SURFACE MARKINGS LYMPHOCYTE CULTURE ROSETTE FORMATION	CIRCULATING ANTIBODIES AND IMMUNOGLOBULINS SURFACE IMMUNOGLOBULINS SURFACE COATING WITH COMPLEMENT AND/OR A TIBODY
IMMUNITY	CELLULAR	HUMORAL
CHEMICAL MEDIATORS	LYMPHOKINES	COMPLEMENT SYSTEM
WORKLOAD	DELAYED-TYPE HYPERSENSITIVITY CELLULAR SURVEILLANCE AND DEFENCE	HUMORAL ANTIBODY DEFENCE AT PORTAL OF ENTRY AND IN VASCULAR SYSTEM
DEFICIENCY INFECTIONS	VIRUS FUNGUS	BACTERIAL
INHIBITORY AGENTS	ANTI-LYMPHOCYTIC SERUM AZATHIOPRINE	ANTI-PLASMA CELL SERUM CYCLOPHOSPHAMIDE

pellen dinitrochlorobenzene (DNCB) and Californian Keyhole limpet haemocyanin (KLH) Lack of response is a feature of disorders in which there is depression of delayed-type hypersensitivity and impairment of cellular immunity (Table 2)

Assessment of T Cell Function

a) Skin Tests

Palmer and Reed (1975) advocate a simple and standardised approach for the assessment of impaired cell mediated immunity and of T cell function Antigens prepared and used as one dilution comprise

PPD	— 5 TU
Mumps	— Undiluted
Candida	— 1 10 diluted to 1 500
Trichophyton	— 1 10 diluted to 1 500
Streptokinase Streptodornase	— 1 10 diluted to 1 2000

All are applied intradermally to the forearm in 0·1 ml volume and read at 48 hours as induration only Reactivity is defined as induration of 5 mm or greater in diameter

b) In Vitro Tests

Human T lymphocytes react *in vitro* with phytohaemagglutinin by undergoing vigorous blastic transformation and mitotic division and this can be measured to give some indication of *in vitro* reactivity or anergy There is often a good correlation between the response to phytohaemagglutinin and the skin test

When these T cells meet the appropriate antigen they also produce lymphokines which include migration inhibition factor This leucocyte migration inhibition test has been converted into a measure of T cell function and it correlates well with cutaneous hypersensitivity or anergy

T cells also have the capacity to bind sheep erythrocytes into rosettes providing means of distinguishing T cell from B cell activity

Scanning electron microscopy show that T cells have a flat featureless surface

Circulating Immunity

The B (for Bursa of Fabricius) lymphocytes develop into the plasma cell series and are concerned with the synthesis of circulating antibodies Humoral immunity can be assessed roughly by paper zone electrophoresis or by measuring serum immunoglobulins

Whereas electron microscopy reveals the surface of T cells as flat and featureless B cells show numerous projections and immunofluorescent techniques indicate that

Table 2

Disorders associated with depression of delayed-type hypersensitivity

1	PHYSIOLOGICAL STATES – NEWBORN – ELDERLY
2	DRUGS – CORTICOSTEROIDS – CYTOTOXIC ANTI LYMPHOCYTIC SERUM VIRAL VACCINES OESTROGENS
3	IRRADIATION
4	THYMIC HYPOPLASIA THYMECTOMY RUNT DISEASE
5	SARCOIDOSIS RETICULOSIS LYMPHOBLASTOMA PRIMARY BILIARY CIRRHOSIS LEPROMATOUS LEPROSY
6	'EXPERIMENTS OF NATURE PAEDIATRIC IMMUNODEFICIENCIES
7	URAEMIA CACHEXIA
8	HYPNOSIS

Table I

[illegible]

they represent surface immunoglobulins There are five major immunoglobulin classes with differing structures physical and biological properties (Table 3)

K Cells

K or killer cells are cytotoxic lymphocytes They are not immunologically competent like T and B cells Unlike T cells they develop independently of thymic influence Unlike B cells they do not carry surface immunoglobulins They kill cells whose antigens are sensitised with IgG being triggered to cytotoxic activity by the Fc part of the IgG molecule (MacLennan 1975)

Null Cells

Null cells are leatarelass lymphocytes which lack B and T cell markers Lymphocytes committed to the T cell pathway of growth and development come under the influence of a thymic hormone thymosin which teaches them to respond to T cell mitogens and to express T cell surface antigens such as theta

Null cells are increased and T cells markedly reduced in active systemic lupus erythematosus and this ratio reverts towards normal following thymosin treatment (Scheinberg Cathcart Goldstein 1975) These observations indicate that this disorder is characterised by a large number of circulating immature T cells and also suggest one possible line of treatment

Immune Reactions

Irvine (1974) has defined six distinct immune mechanisms which release various chemical mediators leading to pathological changes in involved tissues and to characteristic clinical disorders (Table 4)

Type I (Fig 1)

Immediate type or anaphylactic hypersensitivity is the basic immunological reaction underlying common allergic disorders Within minutes of contact between the offending antigen and tissue mast cells there is release of histamine serotonin bradykinin and slow reacting substance causing smooth muscle spasm vasoconstriction, capillary damage and oedema This sequence of events occurs in the allergic individual whose serum contains skin sensitising antibody, now designated reagin and recognised to be IgE (Table 3) Its serum concentration is considerably elevated in the allergic individual in the course of an acute allergic episode

This is the mechanism which operates in hay fever asthma urticaria and allergic conjunctivitis

Since histamine is released by mast cells antihistamines have been a logical line of therapy However it is clearly preferable to recognise and contain the reaction before the mast cell disrupts that is before the stage of histamine release This is now

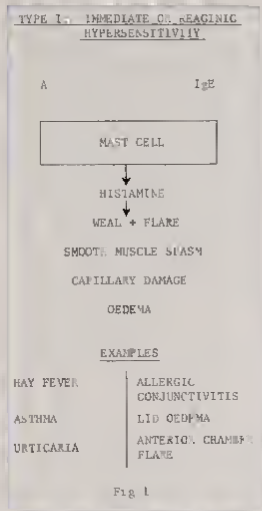

Fig 1

possible for sodium cromoglycate (INTAL) prevents the antigen antibody reaction which disrupts mast cells

Type II (Fig 2)

Cytotoxic tissue-specific antibody reacts with an antigenic component of a cell or tissue to cause smooth muscle spasm capillary damage and cell death

When B cells proliferate they generate plasma cells either independently or in co operation with T lymphocytes These plasma cells produce autoantibodies which are cytotoxic to target cells In Type II this involves complement whereas in Type VI reactions the cytotoxicity seems to be independent of complement

Autoimmune disorders with cytotoxicity of various target organs provide clinical examples These mechanisms are not yet clearcut and there may be overlap Hashimoto s thyroiditis may be associated with Types II IV and VI reactions (Irvine 1974)

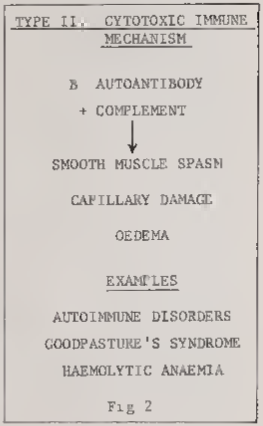

Fig 2

Type III (Fig 3)

Immune complexes (Arthus) are large molecular aggregates composed of antigen antibody and complement They are constantly being formed in the circulation as a means of clearing it of offending antigen but these circulating immune complexes may give rise to thrombosis haemorrhage and ischaemic necrosis in tissues When antigen is in excess of antibodies IgG and IgM the complex remains soluble and may persist in the circulation but when antibody is in excess

immune complexes tend to be insoluble and rapidly removed by the reticuloendothelial system Complexes formed in the region of antigen antibody equivalence may be associated with granuloma formation

Immune complex tissue injury causes serum sickness glomerulo nephritis systemic lupus erythematosus and polyarteritis nodosa

We have noted circulating immune complexes only in the early stage of sarcoidosis when erythema nodosum and acute iritis were present but not in its later stages (James Neville and Walker 1975) Immune complexes may likewise be responsible for retinal vasculitis and Eales' disease and scleritis

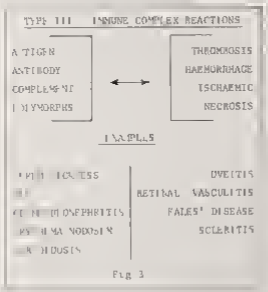

Fig 3

Type IV (Fig 4)

Delayed type hypersensitivity is mediated by contact of antigen with sensitised mononuclear cells Macrophages and T cells are involved releasing lymphokines which include migration inhibition factor Complement and circulating antibody are not involved in the process Macrophages lead to epithelioid cells which are poorly phagocytic but highly secretory and these in turn form giant cells giving rise to granuloma formation Granulomas disturb the traffic of recirculating cells within lymphoid organs and this disturbance could contribute to the depression of cell mediated immunity associated with granulomatous disorders (Bullock 1976) Macrophages secrete lyzozyme collagenase elastase and plasminogen activator perpetuating inflammation and granuloma formation. This secretory activity can be measured by the serum lyzozyme level which is a marker of immunologically induced granulomatous inflammation (Perrotto Falchuk Pelley Warren and Isselbacher 1976)

This mechanism gives rise to contact dermatitis graft rejection phacoantigenic uveitis and granulomatous disorders

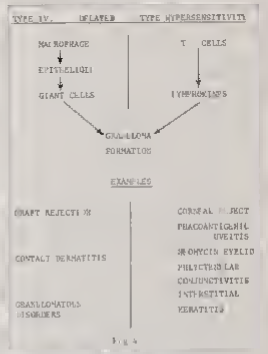

Fig 4

Type V (Fig 5)

Stimulating antibody mediated by B cells and produced by plasma cells is an autoantibody which may stimulate target cells to overproduction This is conceivable in thyrotoxicosis and endocrine

exophthalmos Long acting thyroid stimulator is an autoantibody which may combine with the thyroid near the thyroid stimulating hormone site where it activates the adenyl cyclase cyclic adenosine mono phosphate system at the cell surface (Donach 1975)

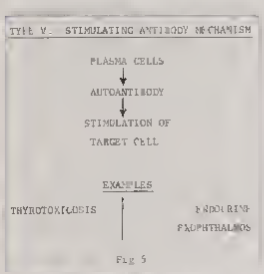

Fig 5

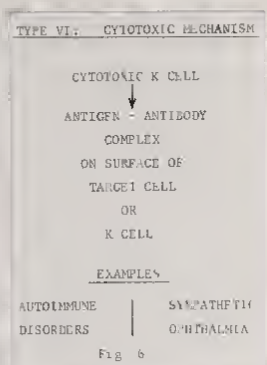

Fig 6

Type VI (Fig 6)

K cell autoantibody-mediated cytotoxicity involves the deposition of antigen antibody complexes on the surface of K cells or target cells This mechanism differs from Type V by causing cytotoxic damage to the target cell rather than over production It is likely that more than one mechanism may be operative and the clinical disorder reflects which mechanism is operative under particular circumstances (Irvine 1974) It is one of the mechanisms postulated for the production of auto-immune disorders

Autoimmune Disorders

For reasons at present obscure allergic reactivity which is normally directed against foreign antigenic invasion becomes misdirected against the patient s own antigens This stage of autoallergy is mediated by the antibody-producing B lymphocytes and by proliferation of sensitised effector T cells If these autoreactive B and T cells are not eliminated blocked or suppressed then autoallergic reactions are produced along the classical lines of five of the six types of immune mechanisms already outlined (Table 4) The one exception is Type I immediate or reaginic reactions which do not seem to play a part in autoallergic disease

For the clinician there are certain well recognised indicators of an autoimmune process

a) The presence of serological autoantibodies against a target organ such as stomach thyroid colon parotid gland Serum of patients with Sjogren s syndrome for instance have parotid autoantibodies and serum of patients with Behçet's syndrome may have antibodies against foetal oral mucosa

b) An increased incidence of non specific circulating antibodies including a false positive Wassermann reaction cold agglutinins anti-DNA antibodies

c) Plasma cell infiltration of involved tissues

d) Fluorescent staining reveals immunoglobulins alongside these plasma cells

e) Associated autoimmune disorders in the same patient and in family studies Thus, uveitis is associated with arthritis and colitis in an interwoven pattern of disorders Primary biliary cirrhosis is found in association with kerato-conjunctivitis sicca Thyroid disease may form interwoven patterns with pernicious anaemia vitiligo diabetes and adrenal deficiency

f) Good clinical response to immunosuppression by steroids azathioprine or antilymphocyte globulin

HLA System

The human leucocyte system of antigens are on the cell membranes of all nucleated cells and platelets but not on mature red blood cells HLA genes are inherited on a pair of autosomal chromosomes half derived from the paternal and half derived from the maternal material Four HLA antigens will be found for any one individual two derived from each of two closely linked genetic loci so four possible genotypes can arise in a family These tissue antigens may immunise any recipient of nucleated cells with the production of antibodies and the development of a cellular immune response. The cells bearing the immunising antigens will be rejected by the recipient unless the response is suppressed

There is now increasing recognition of an association between particular HLA specificities and diseases (Table 5) some of which are highly significant Brewerton and his co workers (1973 1974) have pioneered our knowledge of the association of HL-A 27 and acute anterior uveitis ankylosing spondylitis sacro iliitis Reiter s syndrome seronegative spondylarthritis and chronic inflammatory bowel disease The significance of these associations with iritis in HL-A 27 individuals has been reviewed elsewhere (James 1975)

Part 2
IMMUNOSUPPRESSION AND IMMUNOTHERAPY

Immunosuppression is mainly directed to the suppression of abnormal sensitised lymphocytes which are causing adverse immunologic reactivity The agents described are corticosteroids azathioprine cyclophosphamide chlorambucil and antilymphocyte globulin

Immunotherapy is directed towards repairing breaches in immunity This new field of therapeutics includes transfer factor thymosin BCG vaccination and levamisole

Immunosuppressive Therapy

Corticosteroids

Corticosteroids exert both anti inflammatory and immunosuppressive effects and it is often difficult to disentangle one from the other Since both effects are sometimes needed clinicians sometimes just accept the mixture as the overall effect of corticosteroid therapy

Steroids are striking anti inflammatory agents because they inhibit vascular dilatation and the increased permeability and oedema accompanying it and they also inhibit polymorph migration They are not

such good immunosuppressive agents and that is why very large doses of systemic steroids became the fashion when used for immunosuppression to cover organ transplants Steroids inhibit cell mediated immune mechanisms and T cell function but they do not suppress antibody production or overcome humoral immunity

Azathioprine (Imuran)

6 mercaptopurine is an analogue of the purine base hypoxanthine Azathioprine is a modification of 6 mercaptopurine in which an imidazole group has been attached to the sulphur atom Azathioprine is rapidly broken down to 6 mercaptopurine in the body so the biochemical effects are largely those of the latter Xanthine oxidase inactivates most of the drug a fact which should be borne in mind when the xanthine oxidase inhibitor allopurinol is also being used in the same patient

Azathioprine as a purine antimetabolite exerts its effect on immunologically active cells which require purines during the proliferative response following stimulation by antigen It inhibits both cellular and humoral responses but it does not interfere with phagocytosis or interferon production Since azathioprine does not act until the proliferative stage of antigen antibody reaction it has no prophylactic value and there seems to be no good reason for administering it before organ transplantation has taken place (Berenbaum 1975)

There is a growing list of disorders for which it may be used (Table 6) There are two broad clinical principles upon which it should be considered- Firstly will it help to suppress inflammation which is causing damage which may be irreversible if not stemmed early? Autoimmune disorders predominate in this category The second principle guiding its use is whether its use with steroids may permit a welcome reduction in the dose of oral steroids This may be particularly important in the elderly osteoporotic subject the diabetic the hypertensive and the psychologically disturbed in whom steroids may have devastating adverse effects or in the patient who already has posterior cortical cataracts from steroid overdosage

Table 6

Indications for Oral Azathioprine in General Medicine

ORGAN TRANSPLANTATION
AUTOIMMUNE DISORDERS
- CHRONIC ACTIVE HEPATITIS
RHEUMATOID ARTHRITIS
- SYSTEMIC LUPUS ERYTHEMATOSUS
AUTOIMMUNE HAEMOLYTIC ANAEMIA
- IDIOPATHIC THROMBOCYTOPENIC PURPURA
ULCERATIVE COLITIS
PEMPHIGUS
- SJOGREN S SYNDROME
GRANULOMATOUS DISORDERS
WEGENER S GRANULOMATOSIS
- CROHN S DISEASE
PRIMARY BILIARY CIRRHOSIS
- SARCOIDOSIS

The usual daily dose of azathioprine is 2 to 3 mg/kg and it is common to prescribe it as 50 mg three times daily-

Cyclophosphamide and Chlorambucil

Cyclophosphamide is an alkylating agent for it is a compound which has an alkyl radical end group this tail reacts with other molecules by a process of cross linking in the liver to provide active metabolites Cyclophosphamide cross links complementary DNA strands thereby preventing strand separation and so its ability to act as template for new DNA synthesis Thus cell replication is inhibited It seems to act preferentially on B rather than T cells possibly because of differences in their rate of proliferation

its disadvantages are haemorrhagic cystitis leucopenia testicular atrophy and oligospermia

Chlorambucil is another alkylating agent with similar mode of action It is considered useful in some value in the treatment of progressive systemic sclerosis systemic lupus erythematosus steroid dependent nephrotic syndrome and for malignant tumours Dinning and Perkins (1975) noted improvement in 3 of 5 patients with Behçet's disease treated with chlorambucil

Antilymphocytic Globulin (ALG)

ALG an IgG is a potent inhibitor of cellular immune responses abolishing cell mediated but largely sparing humoral antibody responses Its efficacy has been demonstrated by its ability to improve the survival of mismatched renal allografts decrease the incidence of early rejection crises and even reverse a crisis prolong skin allografts and suppress autoimmune disorders It acts within the intravascular compartment and only reaches extravascular sites in low concentration It coats intravascular lymphocytes with antibody opsonising them for phagocytosis in the liver Since ALG acts on circulating T cells, it coats them before they reach antigen so it is of prophylactic value in preventing delayed type reactions This is quite different from azathioprine which only acts after antigen antibody proliferation Serum complement levels are lowered for two reasons a direct anti complementary activity of ALG and also because antibody coated lymphocytes fix complement

ALG (marketed by Hoechst) is given in a dose of 500 mg by intramuscular or intravenous injection daily for about 2 weeks in conjunction with prednisolone and azathioprine Since it is immunogenic in its own right ALG has a number of adverse reactions including anaphylaxis injection site pain and phlebitis

Table 7

Possible indications for ALG in General Medicine

ORGAN TRANSPLANTATION
MULTIPLE SCLEROSIS
AUTOIMMUNE DISORDERS
SYSTEMIC LUPUS
DERMATOMYOSITIS

The combination of ALG prednisone and azathioprine was sufficiently promising in a London series (Lance *et al* 1975) to justify further investigation of such intensive immunosuppression in multiple sclerosis It is also imperative that multicentre trials are similarly carried out in retrobulbar neuritis There are an increasing number of disorders for which ALG will be considered (Table 7) particularly as it becomes less toxic and less expensive

Immunotherapy

In contrast to immunosuppression which is mainly directed to the suppression of abnormal sensitised lymphocytes producing adverse immunological reactivity immunotherapy repairs breaches in immunity

Transfer Factor

Transfer factor (TF) is a small molecular weight (4000 to 8000) polypeptide or polynucleotide which allows the transfer of cell mediated immunity by means of a cell free extract It is the most potent and reproducible agent in the initiation or reconstitution of cellular immune response *in vivo* to a variety of bacterial fungal viral chemically defined and histo

compatibility antigens Evidence is accumulating that it is immunologically specific but that species barriers have been successfully breached by linking human TF differentially to mouse monkey or human lymphocytes The growing list of diseases in which TF has been reported to be efficacious may be classified into three groups — congenital cellular immune deficiency states infectious diseases and neoplastic disorders The most dramatic and successful use has been in the Wiskott-Aldrich syndrome and the treatment of mucocutaneous candidiasis Following TF therapy skin testing demonstrates intact delayed type hypersensitivity and the recipient s lymphocytes are capable of lymphocyte transformation and display migration inhibition A remission lasts about six months and can be maintained by further spaced injections

Lepromin positive TF seems to convert lepromatous leprosy to the more benign tuberculoid leprosy TF or whole lymphocytes from donors with delayed hypersensitivity to antigens of Mycobacterium leprae were used to reconstitute delayed hypersensitivity in nine patients with anergic leprosy Six patients converted from anergy to a positive delayed type response to M leprae antigens Four patients developed erythema nodosum and three also had fever and arthralgia Within a week of transfer factor six patients also experienced erythematous indurative changes within leprous skin infiltrates regressing again by the twelfth day (Bullock Fields Brandriso 1972) These clinical responses which coincide with reconstitution of cellular immunity by TF can be controlled by simultaneous oral corticosteroid therapy

Lawrence (1972) has reviewed the rich promise of immunotherapy with transfer factor in lepromatous leprosy the Wiskott-Aldrich syndrome Swiss-type agammaglobulinaemia disseminated mucocutaneous candidiasis and coccidioidomycosis and possibly even in anergic patients with sarcoidosis Hodgkin's disease melanoma leukaemia and sarcoma In addition Schulman Schulkind Ayoub (1974) have recommended the use of transfer factor for the treatment of chronic active hepatitis associated with persistence of hepatitis B antigen

Thymic Hormones

Several new thymic hormones have been isolated chiefly from the calf thymus but also from mouse and man They are polypeptides of molecular weight (MW 1 000 to 75 000)

Thymosin of MW 12 000 is able to reconstitute cell mediated immunological competence in neonatally thymectomised mice but it does not influence IgM or IgG antibody synthesis Its ability to confer competence can be demonstrated by

(a) a newly acquired responsiveness to phytohaemagglutinin
(b) the ability to stimulate mouse bone marrow cells to produce a graft versus host reaction and
(c) the production of increased numbers of rosette forming cells sensitive to azathioprine and to anti lymphocytic serum

Thymosin converts immature featureless Null cells into T cells with theta surface antigens and the ability to respond to T cell mitogens Thymosin may prove useful in the management of active systematic lupus erythematosus in which there is an increase in Null cells and a corresponding decrease in mature T cells (Scheinberg *et al.* 1975)

BCG Vaccine and Levamisole

It is likely that they stimulate T cells into "superactivity and supersurveillance" of cancer The growing literature on their use in rheumatoid arthritis carcinoma of the bronchus and breast malignant melanoma and Hodgkin s disease is sufficient for a review article of its own

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BOOK REVIEW

DANGEROUS MARINE ANIMALS OF THE INDO-PACIFIC REGION Cai Edmonds pp 235 Wenlle Hill Bio Medical Equipment Services 20 Lambert Rd Toorak Australia $A 14 00 (£8 00) + £1 00 postage.

The book fills a real need as authoritative works on Dangerous Marine Animals are few While Royal Navy Medical Officers are less likely to find themselves in the Far East these days there is still the possibility of having to cope with poisoning or envenomation by the animals which live in tropical seas

This book is full of interesting information and up-to-date knowledge The information is presented in a clear and concise manner divid ng the animals into the classic divisions of those that bite those that are venomous and those that are poisonous to eat Each animal is dealt with in seven sections identification distribution general interest clinical features first aid treatment by medical personnel and prevention

The identification is backed up by a series of excellent colour plates (approx 90) and line drawings The clinical features and treatment of each type of case are given in an easily read tabbed form One expect of the book which they appeal to some are the aphorisms which conclude many of the entries e g if one is close enough to identify the killer whale one is too close

As well as dealing with dangerous marine animals there are also chapters on Resuscitation for beginners Anesthesia and Drowning for doctors These are very welcome additions to such a book as this

Criticisms are of a minor nature Personally more references would have been welcome in place of or in addition to the short recommended reading list at the end of the final chapter I would have liked to see the dangers of secondary drowning and the need for hospitalization of all cases of near drowning even those who here made an apparently good recovery emphasised Finally details on how to obtain the relevant antivenoms for stonefish sea-snake and sea wasp would be very helpful for those who may be planning expeditions to those parts of the world where these animals live

To sum up this book is a worth while investment for any medical officer visiting the Far East or other tropical zone as a ready guide to the diagnosis and treatment of problems which may arise

R de G H

Perforating Wounds of the Eye

H J A Hahn

Evidence in Gaza at the Mill with Slaves
Samson Agonistes

ABSTRACT

A review of 26 cases of perforating wounds of the eye treated in the St John Ophthalmic Hospital Jerusalem with discussion on causes of injury prevention diagnosis treatment and results

Introduction

A perforating wound of the eye is a major disaster It is hard to think of any other common injury which can be caused so easily and yet lead to such serious consequences for the patient

Although some severe eye wounds do well with good visual results the overall prognosis is grave In even the most favourable cases corneal scarring and intraocular damage often lead to a poor end result (Devoe 1974)

Infection at the time of injury may cause an endophthalmitis with consequent loss of the eye Later complications include blockage of the filtration angle by synechiae leading to secondary glaucoma which in an already damaged eye responds but poorly to treatment In other cases the eye never fully recovers from the original trauma and probably due to ciliary body failure the tension becomes permanently reduced The globe shrinks vision slowly decreases until the eye assumes the sad state of "phthisis bulbi

Some secondary complications are lens opacities which may develop weeks or months after injury and late retinal detachment following organised haemorrhage into the vitreous (Maltzman 1975)

Cause

The types of accident which cause perforating wounds of the eye are legion The majority occur at work in an industrial country during peace time Into this category come injuries from chisels and screwdrivers and flying fragments of metal glass wood stone or hard plastics Burst glass bottles in aerated drinks factories and pieces of steel from hammer heads in engineering works are classical causes of perforation with retained foreign bodies

In recreation and in the home there are many causes for eye wounds The rebounding dart and the air rifle slug the scissors and the sewing needle all take a tragic toll of eyes In "Do It Yourself" activities the broken electric drill bit the exploding carborundum wheel and the brittle hard steel masonry nail are common causes of injury

In traffic accidents shattered windscreens — and more treacherously the splintered driving mirror — cause terrible eye wounds which are often bilateral

Children at play may perforate each other's eyes with stones sticks or toy arrows whilst in the garden there are tree branches and rosethorns to lacerate the eye of the unwary gardener

Protection

Many wounds of the eye can be avoided

by wearing protective goggles in hazardous occupations In industry these are obligatory in many trades where dangerous fragments are liable to fly The Do It Yourself enthusiast does well to use a pair of plastic goggles when chipping concrete or lathe working The nut splitter and rivet shears should be treated with respect not only by the person using them but also by any onlooker

The dangers of a screwdriver slipping should be remembered especially on awkward screw heads or when levering open a tin of paint The toys of young children need to be scrutinised for dangerous spikes and the use of bows and arrows darts and other mediaeval missiles discouraged unless properly supervised

Diagnosis

There is usually a clear history of injury to the eye but sometimes especially in children nothing definite may be admitted In such cases the patient presents with an irritable eye which he may keep closed Except at the moment of injury many perforating wounds are remarkably painless Young children are often little disturbed by the injury which may make the diagnosis in such cases rather difficult Small perforations in children can easily be missed with disastrous results Hence all children in whom an eye injury is suspected should be examined under a general anaesthetic unless they happen to be unusually co operative and a satisfactory examination can be made in the out patient clinic

Traffic accident cases and explosion casualties should always have careful examination of the eyes to exclude perforating wounds In these cases, in particular such wounds may easily be missed while the surgeon s attention is concentrated on the more obvious injuries

Usually a wound of the globe is easily seen If it is in the cornea the wound edges soon become oedematous and appear as a white line If in the sclera prolapsed uveal tissue is likely to be seen as a black mark and a blob of glistening vitreous may also be present

In corneal wounds the anterior chamber is usually flat immediately after the injury due to loss of aqueous As the fluid escapes the iris tends to be swept forwards into the wound and becomes either incarcerated in or actually prolapses through the wound producing a characteristic black blob

The pupil may be distorted to a comma shape — a useful though not invariable sign of perforating wound The iris often seals the perforation and the continued formation of aqueous rapidly re fills the anterior chamber Hence many patients have a reformed anterior chamber by the time they are seen

If the iris or other vascular tissue is wounded blood will accumulate in the anterior chamber forming a hyphaema The red cells settle to the bottom of the chamber forming a semilunar deposit with a straight upper edge If the bleeding is profuse the entire anterior chamber may be filled with blood The hyphaema is then described as total The pupil may be greyish instead of black indicating rupture of the lens capsule and the presence of traumatic cataract Dislocation of the lens or even its total loss through the corneal wound is not an uncommon occurrence in a severe injury Occasionally the lens may be extruded and found under the conjunctiva

In many violent injuries with perforation or rupture of the globe haemorrhage occurs into the vitreous from either choroidal or retinal vessels The prognosis is particularly poor in these cases as irreparable retinal damage is often caused at the same time The vitreous haemorrhage however may clear up quite well in some cases In large wounds involving cornea and sclera a massive intra ocular haemorrhage may

sometimes cause extrusion of the entire contents of the eye at the time of injury

Retained intra-ocular foreign bodies must always be borne in mind when examining a case of perforated globe Orbital x ray should be taken to confirm or exclude the presence of a radio-opaque fragment

In all cases the visual acuity should be recorded This may vary from unaltered vision to loss of light perception depending on the nature of the wound and the amount of intra-ocular damage which has been caused

Medical Treatment

As a first aid measure the eye should be lightly padded Antibiotic drops (e g Guttae Chloramphenicol 0 5 per cent) may be instilled but as a rule no mydriatics should be given An exception may be made in cases which owing to distance from hospital may not receive surgery for several hours In such a case Guttae Atropine 1 per cent may be instilled to prevent iris adhesions occurring during the interim period Early admission to hospital is important as delay in surgical treatment may increase the risk of infection Under Service conditions a perforating eye wound would fully justify helicopter evacuation

Discussion

This series of twenty six cases of perforating wounds of the eye was treated by the author at the St John Ophthalmic Hospital Jerusalem between February and December 1975 during a period of loan service from the Royal Navy This is a greater number of cases than one might expect to encounter in a similar period elsewhere The St John Hospital receives cases from a wide area of Southern Israel from the Gaza Strip to the Jordan Frontier — and beyond The rather turbulent behaviour of the local inhabitants accounts for a high incidence of eye injuries of every sort Several of my cases were caused by stone throwing — a traditional eastern sport since Biblical times — or by other forms of combat amongst young adults and children Other causes were accidents at work or in the home None of my series was caused by traffic accident or bomb blast and none were simultaneous bilateral injuries

The age range was very wide from eighteen months to eighty years Twenty two cases were males (84%) and there was only a small preponderance of right eyes (53%)

The causes of injury are grouped in the table Cases 1 6 were caused by stones and were all corneal or corneo-scleral with wounds of considerable size In two cases of this group there was hyphaema and iris prolapse in one there was hyphaema alone and in one iris prolapse alone In four cases the lens was severely injured Vitreous loss occurred in three cases and vitreous haemorrhage in four but the last two conditions were not necessarily coincidental

The delay between the injury and surgery varied considerably (2 to 24 hours) and the one case which became grossly infected with eventual loss of the eye (Case 1) was not one in which there had been excessive delay

Visual results were generally poor but half the cases were in young children in whom visual acuity could not be ascertained Case 2 had a surprisingly good visual result considering the amount of intra ocular bleeding which occurred and yet absorbed spontaneously

Cases 7 10 were caused by broken glass three of these being the result of accidents at work Two had severe eyelid wounds (exploding Coke' bottles) two had corneal lacerations one was scleral only and one was corneo scleral The wounds were all cleanly incised making accurate closure easy but hyphaema occurred in two of the cases and iris prolapse in one In this group

the visual results were better than in the first probably because the violence inflicted on the eye was less severe and in none of them was the lens injured

The third group (Cases 11 15) was caused by various wooden objects The first two cases were simple radial corneal cuts caused by sharp sticks The second of these was a steepty shelving wound but both had a fairly satisfactory result with no lens injury The patients were again too young to assess visual acuity The third case was a ragged corneal rupture caused by a blunt tree branch There was considerable intra ocular bleeding an early traumatic cataract and probably retinal damage but no view of the fundus was possible Number 14 was interesting as a case of ruptured cataract section only one week after operation The patient was chopping wood when a large piece of stick flew up and struck the eye He did not return to the out-patient clinic until a fortnight after the injury when a huge iris prolapse was present but the anterior chamber of the eye was reformed Iridectomy and re suture of the section was carried out with a conjunctival hood drawn down to reinforce the wound In spite of the long delay no infection occurred presumably because the prolapsed iris acted as a barrier Initially at least the visual result in this case was encouraging

Case 15 was a monster corneo scleral rupture from a blow with a spade handle There was a large exposed area of uveal tissue bulging through the split sclera but no vitreous loss A massive intra-ocular haemorrhage was present

Surgical repair was not difficult and the uveal tissue was reposited without any excision In view of the violent injury the prognosis for vision appeared bad Unfortunately the follow up period was very short

The final group of cases (16 25) was the largest and consisted of metallic injuries The wounds ranged from a tiny needle prick (Case 22) which penetrated iris and lens to an almost total keratectomy (Case 18) caused by a piece of wire The latter case was in a way the most bizarre of the whole series The patient an Arab boy of 15 years was mentally retarded and had already lost his left eye from an axe injury at the age of 5 years The left globe was shrunken and blind He presented with an enormous defect in the right cornea exposing the bare vitreous face The lens was absent Under general anaesthetic the corneal flap was found rolled up in the inferior fornix and still attached at the limbus by a small pedicle of tissue After aspiration of some vitreous the flap was sutured back like a corneal graft using interrupted sutures This boy was followed up for six months and still retained light perception at the end of this time although the eye was showing signs of shrinking and the cornea was partly vascularised The circumstances of this injury were mysterious and self mutilation seems a possibility in this case

Two examples of retained intra-ocular foreign body occur in this group (Case 19 and 20) In the first a small radio opaque fragment was seen on X ray apparently far back in the posterior segment It had entered through a limbal wound missing the lens There was a large vitreous haemorrhage and exact localisation of the fragment which appeared very small was not possible. It was felt that an attempt at extraction would cause more damage to the eye than would leaving it *in situ*

In the second case the foreign body had entered through the cornea and had destroyed the lens

X ray examination showed a large fragment near the centre of the globe Magnet extraction through the entry wound was successful The foreign body which was a piece of steel hammer head measured 5mm × 3mm × 1mm Soft lens matter was washed out of the anterior chamber one week later and when last seen the

condition of the eye was satisfactory Again the follow up period was very short in this case because of failure to re attend the out patient clinic

The other cases in this group include two knife stabs (Cases 24 25) In one of these (24) the track of the knife was so oblique that the entry was near the centre of the cornea but the internal wound opened into the angle of the anterior chamber The wound was so valvular that the globe felt firm It was not until examination under anaesthesia that the penetrating nature of the injury was discovered Here the diagnosis might have been missed and the condition mistaken for a deep corneal abrasion The last case in the series was a child said to have been poked in the eye by a finger three days previously since when the eye had been red and irritable There was a large hyphaema and on examination under anaesthetic a wound was found at the upper limbus There was a small iris prolapse surrounded by stripped corneal epithelium — presumably caused by a finger nail This was again a case in which accurate examination and diagnosis was impossible without a general anaesthetic

Surgical Technique

The majority of cases were operated upon under general anaesthesia The exceptions were cases 7 14 18 20 23 and 25 in which facial nerve block and retrobulbar anaesthesia were used The reason for this was lack of an anaesthetist on these occasions A general anaesthetic is much to be preferred in all perforating wound surgery Even a well sedated patient is liable to be nervous and restless when awake and the suturing of the eye wounds was noted to be more difficult in these cases for this reason

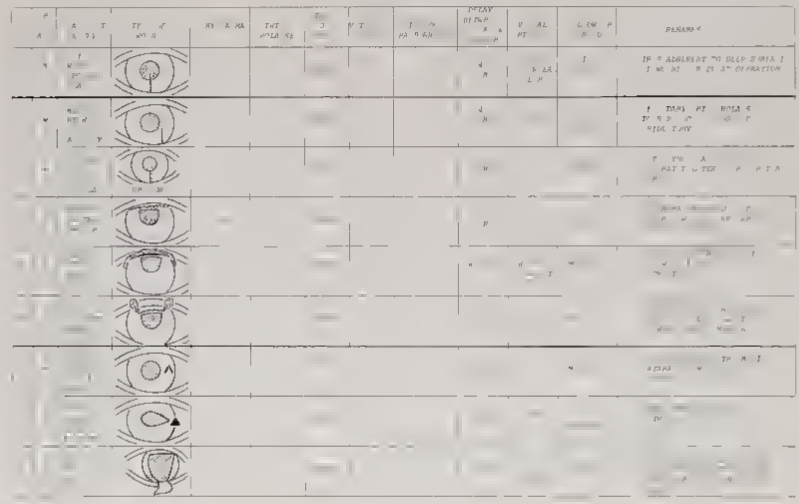
All operations were carried out under the Zeiss operating microscope using a magnification of about × 4 Interrupted sutures of 8-0 gauge blue virgin silk with swaged needles were used as a routine for cornea sclera and conjunctiva In central corneal wounds where scarring would involve the pupil area 10-0 gauge black Perlon sutures were used with great advantage Prolapsed uveal tissue was excised flush with the wound and any incarcerated within the wound edges was then reposited When necessary a limbal puncture was made with Ziegler s needle and a fine iris repositor inserted to sweep adherent iris off the deep surface of the wound Care was taken to free the iris as far as possible to prevent anterior synechiae

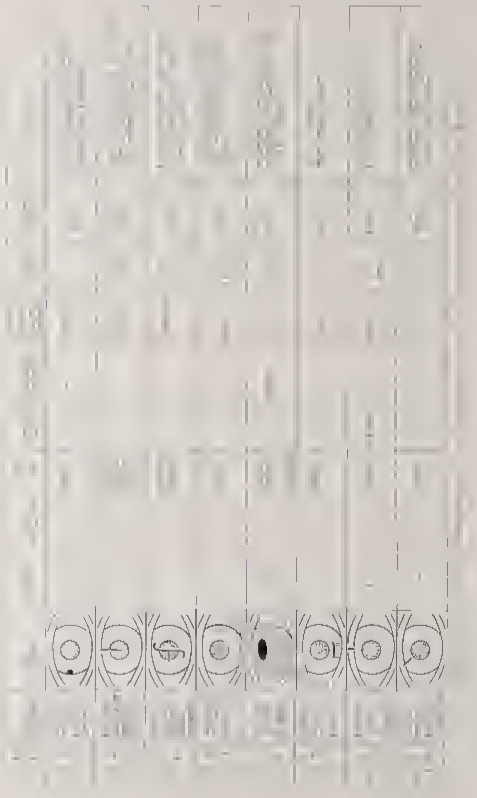
In all cases where the eye was partially collapsed at the end of operation normal saline was injected to reconstitute it either through a limbal puncture or through the wound itself As a routine measure a small air bubble was injected into the anterior chamber to hold back the iris from the cornea

In all cases Soframycin 500mgms in 1ml was injected sub-conjunctivally at the end of operation and Guttae Chloramphenicol 0 5 per cent and Guttae Atropine 1 per cent instilled

All eyes were padded and bandaged for at least 24 hours and thereafter were usually covered with a Cartella shield only for a week Post operatively antibiotic drops (usually Chloramphenicol) and mydriatics were given in all cases Steroids were usually withheld for the first 2 3 days and then only used if there were signs of iritis or if the eye was particularly red and irritable

Corneal sutures were removed after 3 months unless vascularisation of the scar made this desirable sooner No instances of wound breakdown were seen In case 23 however the corneal rupture became ectatic within a few weeks and probably broke down subsequently This was a very unhealthy and senile cornea affected by old trachomatous scarring In none of the cases was there any sign of sympathetic ophthalmia during the follow up period





No injured eyes were excised at the first operation and only one (Case 1) was enucleated subsequently. With the poor rate of follow up it is most likely that some of the other injured eyes were removed elsewhere unbeknown to the author.

Conclusions

1. Perforating wounds of the eye generally carry a poor prognosis for vision.
2. The most favourable cases are those with a cleanly cut corneal wound away from the centre and not affecting the lens or iris. In my series this was more often the case with broken glass injuries than with other agents.
3. Burst eye-balls caused by heavy blunt objects with intra ocular bleeding form the least favourable group of injuries.
4. In young children an examination under anaesthesia should be made in any case of eye injury to exclude a perforation. Without this a small wound may be missed.
5. Perforations should be operated upon without delay but in this series intra ocular infection was rare. Routine sub conjunctival injection of Solramycin is thought to account for this satisfactory result.
6. Even an apparently hopeless injury should be repaired in the first instance rather than excise the eye as sometimes the outcome may be unexpectedly good. If necessary a blind painful eye may always be excised later as an elective procedure.

Acknowledgements

My thanks are due to Mr T. Keith Lyle CB FRCP FRCS Hospitaller St John for his help and advice in preparing this paper and to Mr K. L. Batten FRCS Warden of the St John Ophthalmic Hospital Jerusalem for permission to publish the cases.

My thanks are also due to Mr David Hunter FRCS for much helpful information on technique.

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BOOK REVIEW

A LABORATORY GUIDE TO CLINICAL DIAGNOSIS Fourth edition R. D. Lidstone Pp. 315. Bristol John Wright & Sons Ltd £2.50.

The latest edition of this little book is a pocket book that has been published since the first. Brief notes are given on the diagnostic significance of the results of laboratory investigations which are in common use. It is a hard work for an experienced author to keep up with the ever increasing mass of knowledge in the specialties of pathology. It is not clear how the author has set about this task. Perhaps the best guide would be the Sister Tutor in charge of a pathology laboratory who has to supply the information which is required by the medical staff.

P. H. C.

Oral Lymphomas

S N Bussell

ABSTRACT

Meta [illegible] appears [illegible] oral cavity. [illegible] fibrosarcoma, [illegible] reticulum cell sarcoma [illegible] carcinoma—not as deep seated [illegible] here in.

Introduction

Lymphoma is a general term used to define all malignant tumours of lymphoid tissue The older term of reticuloses was sometimes formerly used to describe these lesions but the terminology is now generally based on the histological appearance and is consequently often somewhat confused as these tumours can be difficult to interpret microscopically and classify

The following classification (Lucas 1972) lists the various lesions conveniently

1 Follicular lymphoma
2 Lymphosarcoma
3 Reticulum cell sarcoma
4 Hodgkin's Disease

Related conditions are mycosis fungoides, Burkitt's tumour and the leukaemias

Tumours may occur in both the hard and soft tissues of the head and neck region They may present as a primary lesion to be followed by involvement of lymph nodes spleen or liver or alternatively the oral symptomatic lesion may be one of many that are widespread throughout the body (Cook 1961) Malignant lymphomas are twice as common in males as in females (Harrison 1962) and persons of all ages may be affected

Hodgkin's disease is usually found in young men past the age of twenty years though rarely in the mouth More commonly lymphosarcoma reticulum cell sarcoma and follicular lymphoma are encountered in the oral cavity usually in persons past their fourth decade (Tillman 1965)

Cook (1961) has reviewed thirty four single cases of lymphoma of the mouth reported in the literature and shows that the mandible and maxilla are affected in equal incidence

In a review of 47 cases of established malignant lymphoma of the jaws seen at the Mayo Clinic (Steg Dahlin & Gores 1959) the following presenting signs and symptoms were recorded in order of incidence swelling, ranging from hard to soft and diffuse to localised pain usually severe and sore or aching in nature lymphadenopathy usually affecting the sub maxillary and upper cervical rather than the other cervical nodes ulceration nasal obstruction ocular proptosis and numbness principally in the mental region comprised the other presenting signs and symptoms The average duration of symptoms in this series was 10 6 months and the most common radiographic appearance was that of destructive processes of bone and thickened membrana when the antral region was

involved Treatment is invariably by radium or radiotherapy with surgery other than diathermy and biopsy used rarely and then only in collaboration with other methods

Involvement of the dental surgeon with the condition of malignant lymphoma may be in one of the following fields

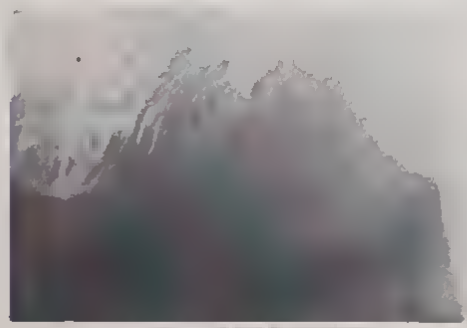
1 Diagnosis after biopsy of a suspected oral lesion
2 The careful management of pre and post irradiation extractions
3 The awareness of and appropriate management for post extraction haemorrhage if there is thrombocytopaenia following irradiation therapy

The following case report is unusual and interesting in that the patient was under periodic review following diagnosed carcinoma of the bladder some four years previously This possibly prompted immediate biopsy procedure in the face of otherwise unequivocal clinical signs and symptoms

Case Report

The patient a male aged 72 years was referred to the Oral Surgery Department at Odstock Hospital by his general medical practitioner with a complaint of pain and swelling of the left palate of 1-2 months duration His medical history revealed that a cystectomy and urethrectomy had been performed in 1971 for carcinoma of the bladder

Clinical examination of the mouth revealed a minimal swelling at the junction of the hard and soft palates on the left side In addition there was tenderness over the region of the left pterygoid hamulus the mucosa in this region being somewhat inflamed The mucous membrane otherwise appeared normal and the remaining standing teeth were $\frac{7\ 6\ 5\ 4\ 3\ 2\ 1\ 1\ 2\ 3}{3\ 4\ 5\ 6\ 7}$ with no obvious associated pathology There was no palpable lymphadenopathy The intra oral X ray picture showed a poorly defined moth eaten area of radiolucency /78 region (Fig 1) and the standard



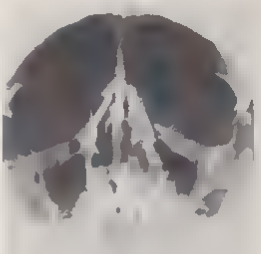


Fig 2 [illegible]

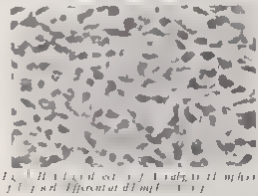


Fig 3 [illegible]

occipitomental view showed a generalised thickening of the left antral lining (Fig 2)

In view of the previous history and presenting signs and symptoms a biopsy was performed under local anaesthesia The histological report stated that after a review of the previous slides of carcinoma of the bladder in 1971 together with the new section 'There is no evident carcinomatous deposit appearances being very suggestive of lymphoma A second pathological opinion stated I agreed that this shows a malignant lymphoma of the poorly differentiated lymphocytic type (Fig 3) The blood picture showed a normal differential and total white cell count with normal red cells and platelets The haemoglobin was 16 9 grams per 100 ml and the E S R was 1 mm/hour (Westergren normal 3 5 mm/hour in males)

The patient was immediately referred to a Consultant Radiotherapist for advice and treatment and he advised localised irradiation to the palatal region initially to a total of 4 500 rads in divided doses All standing upper teeth were removed under local anaesthesia at the request of the Radiotherapist soon after the start of treatment

The overall clinical and radiological picture in this case conforms generally to the reviewed Mayo Clinic series of malignant lymphoma of the oral region (Steg *et al* 1959) and the basic clinical principle of early biopsy proceeding to histological report and establishment of a definitive diagnosis is demonstrated to be of essential importance

Acknowledgements

I am grateful to Mr F G Haselden Consultant Oral Surgeon at Odstock Hospital for permission to publish this case and to Miss J Johnson for her secretarial assistance

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Correction

Plastic Repair of Palatal Oro Nasal Fistula (p 33 Spring 1976) It is regretted that Figs 1 & 3 of this article were transposed

Advances in the Treatment of Tuberculosis

P. D. Clarke

ABSTRACT

[illegible]

Pulmonary Tuberculosis

The standard triple regimen giving isoniazid and PAS for 18 months supplemented initially by streptomycin for 3 months was shown to be effective in pulmonary tuberculosis in the late 1950's (Ross 1958 and Crofton 1960). A recent follow up of the same patients confirmed the original findings (Pearce 1974). Provided that chemotherapy is taken as prescribed relapse is exceptional. If the duration of treatment is reduced to 1 year however there is an appreciable relapse rate (MRC Report 1962).

A recent survey (Clarke 1976) showed that from 1969-1972 standard triple therapy with streptomycin PAS and isoniazid formed the first line of treatment in the Royal Navy. During 1973 and 1974 the introduction of new drugs into the front line of therapy has allowed the use of a wider variety of regimens (Table I). Of the 100 cases treated between 1969 and 1974 20 were not treated with standard regimens. Six were commenced on streptomycin isoniazid and PAS (SHP) but side effects of one or more drugs necessitated a change. It is interesting that 9 patients were commenced on SHP and then treatment was altered to a variety of mixtures of anti-tuberculous drugs. This lack of treatment policy is potentially dangerous although it must be conceded that no treatment failures have resulted probably as a result of excellent supervision of the regimes employed.

Supervision combined with an effective combination of drugs are now accepted as necessary to therapeutic success (Oatway 1974) while traditional methods of rest good food and care have been shown to have little effect on the outcome (Citron 1974).

Much of the recent research in chemotherapy has concentrated upon the development of shortened courses of chemotherapy and also upon less frequent administration of drugs. The former is more important to the Royal Navy for the survey shows that Service personnel are being kept in hospital for between two and three months on average and that the majority are in a reduced category (P7R) for 18 months. There is good evidence that both periods can now be safely reduced. Intermittent drug administration is of greater interest to

developing countries where twice weekly regimens allow closer supervision in outpatients and reduced drug costs

Experience now makes it possible to answer the following questions What drugs are most effective and in what combination? What therapeutic regimen gives the best results in the Service environment?

Drugs Available

(1) *Streptomycin*

A highly effective bactericidal drug which has been used for many years in the standard triple regimen It was given in this regimen for the first three months of the intensive phase of treatment Its principle disadvantages are that it must be given by intramuscular injection and that it has side effects that may limit its use Principal amongst these is ototoxicity when given in doses of greater than 1 gram per day (0 75 g in the elderly)

(2) *Isoniazid*

This drug remains central to the treatment of tuberculosis It was established early on however that resistance rapidly develops to isoniazid unless it is used in combination with other drugs Although the drug is well tolerated in high doses such as are required in twice weekly regimens it may produce a peripheral neuropathy This is usually reversible and may be prevented by the simultaneous administration of pyridoxine Irreversible liver damage is now well documented (Black *et al* 1975) and is one of the arguments against the use of the drug as a prophylactic measure in strongly positive tuberculin skin reactors (Israel 1974) It is not understood why isoniazid given at this early stage of the disease does not induce the emergence of resistant strains of mycobacteria

The drug is metabolized by acetylation in the body and patients may be categorized into slow or fast acetylators depending upon their ability to eliminate the compound This is a genetically determined trait In the United Kingdom about 60 per cent of the population are slow acetylators (Ellard 1975) The acetylator status of patients can be relatively easily established by using a slow release isoniazid preparation and measuring the ratio of acetyl isoniazid to acid labile isoniazid in the urine Whilst it is not of great importance in daily regimens it has considerable importance in intermittent regimens The slow release preparation mentioned is currently under clinical trial and may prove to be of considerable practical value in the future The accepted dosage is 300 mg daily given as a single oral dose

(3) *PAS*

The third drug in the classical triple therapy It is toxic unpleasant to take and is probably the most important deterrent to regular adherence to treatment This has led to a search for alternative regimens that exclude it It is also expensive and thus not widely used in developing countries where thiacetazone has taken its place Despite all this it is highly effective The dosage is 12 t 8 g daily in divided doses by mouth

(4) *Rifampicin*

This is one of the most valuable of the new first line drugs It is bactericidal and rapidly sterilizes the sputum There are relatively few serious side effects unless it is given intermittently when five different toxicity syndromes have been described — influenzal gastrointestinal respiratory shock and purpura These occur in 20-30 per cent (BNF 1976) Girling (1975) has demonstrated that even if a small daily dose is continued between the main dose these side effects may still occur The drug is expensive and the problem with intermittent dosage has led most developing countries to abandon it at present The hepatoxicity reported initially with the drug has been shown to be biochemical and reversible even if treatment is continued

(Lal *et al* 1972 Baron & Bell 1974) The accepted dosage is 600 mg daily (or 450 mg if the patient weighs less than 50 kg) given as a single oral dose

(5) *Ethambutol*

This is the second of the new first line drugs It is bacteriostatic and unless it is used in combination with a bactericidal drug such as rifampicin sputum positivity is prolonged It is an extremely effective companion drug and is ideal for use in the initial intensive phase of chemotherapy (BTTA 1975) It should not be given in a dose exceeding 25 mg/Kg/day and even then for as short a period as possible Recent trials (BTTA 1975) have not reported ocular toxicity at this dosage when used for the initial two months of treatment It is an oral drug given once daily and thus has considerable advantage over streptomycin in patient acceptance

(6) *Pyrazinamide*

In combination with streptomycin this drug is highly bactericidal irrespective of pH (Mitchison 1975) In short course regimens it will undoubtedly have a place alongside rifampicin although it is said to have a hepatotoxic effect in 8-20% of patients (Lowbury *et al* 1975) It has not received as much attention in this country as ethambutol and rifampicin but it may have a synergistic effect with rifampicin (EA/MRC 1974b) and is expected to be included in future trials The dosage is 1 5g (or 2g for heavier patients) given as a single daily oral dose.

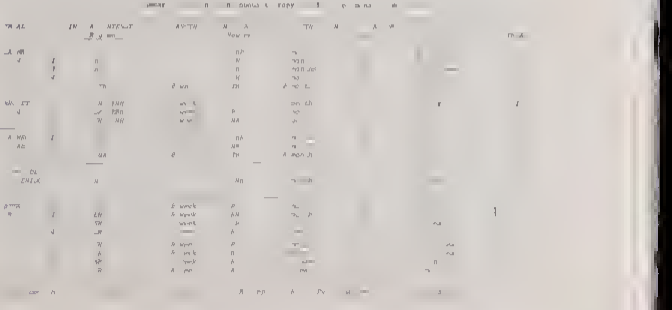
(7) *Thioacetazone*

A cheap drug which has been used extensively in Africa in combination with isoniazid as the standard continuation therapy Its place is limited in short course chemotherapy as demonstrated by the EA/MRC (1974a) trial The dosage is 150 mg orally in a single daily dose

Drug Combinations

Table 2 summarizes the results of recent trials The most relevant combinations to the Royal Navy are

1 Ethambutol rifampicin and isoniazid and



2 Streptomycin rifampicin and isoniazid

Length of Initial Period of Intensive Treatment

Most trials have employed three drugs for an initial period of treatment lasting eight weeks There appears to be no particular advantage with the modern drug combinations to continuing for longer although this aspect has not been fully explored It is thought that this period of intensive treatment is required to produce rapid sterilization of sputum and avoid long term relapses

Overall Length of Treatment

All recent trials that have used a six month course of treatment have ended with a relapse rate of about 3 per cent after a two year follow up period In two major trials (BTTA 1975 Brouet & Roussel 1974) after nine months treatment no relapses have been demonstrated during the same follow up In the past many trials have shown that the majority of relapses occur within this period and there is thus good reason to suppose that further relapses will become increasingly unlikely as time passes

In the BTTA (1975) trial patients with small cavities were allocated to the six month regimen and showed a 3 per cent relapse rate but those with larger cavities assigned to a nine month course showed no relapse The trial is impeccable in design and the numbers substantial

Intermittent Regimens

These are currently being extensively investigated in Hong Kong India and East Africa In these countries they have the advantage of ensuring regular medication by using a twice weekly supervised regimen as well as reducing costs Results are encouraging and said to be as good as using daily unsupervised regimens What evidence is available (Poh 1975) suggests that intermittent rifampicin may prove to be impractical due to side effects and if pyrazinamide is used it must be given with streptomycin to be bactericidal (Mitchison 1975) In the Royal Navy there would seem to be little advantage to adopting one of these largely unproved regimens at present for supervision is much easier

Surgery

Surgery now has little place in the treatment of pulmonary tuberculosis The only two remaining indications are the drainage of an empyema and for diagnostic purposes in an uncertain lesion

Disseminated Disease

The natural history of tuberculosis is such that a certain proportion of patients contracting the primary infection in childhood disseminate the organism widely at that time If this infection overwhelms the host defence mechanism, then miliary tuberculosis results In senescence reactive disseminated or cryptic tuberculosis may result from the failure of immune mechanisms at that time At any time during life particularly during periods of suppressed immunocompetence as with cytotoxic drugs or steroids the disseminated organisms may break through into active disease The most important sites of such reactivation are urinogenital meninges joints pericardium and bones — notably the spine The other forms of tuberculosis encountered are those due to bovine tubercle which invades the cervical lymph glands via the tonsils and may also produce ileocaecal infection with spread to the abdominal lymph glands This form of tuberculosis is now rare in the indigenous population of the United Kingdom but is not uncommon among immigrants and personnel of foreign navies These various forms of the disease will be briefly discussed

(a) *Miliary Tuberculosis*

The clinical features have been reviewed by Proudfoot (1971) Whether this be the acute miliary tuberculosis seen in childhood or the areactive cryptic disseminated tuberculosis of later years it responds well to ethambutol isoniazid and rifampicin in the standard regimen

(b) *Genito urinary tuberculosis* (Horne 1975 O'Boyle 1976)

The advent of short course chemotherapy with the same regimen as for pulmonary tuberculosis namely ethambutol isoniazid and rifampicin for an initial intensive phase of two months followed by isoniazid and rifampicin for a continuation period of a further 6 7 months has altered the management of this disease Rifampicin is highly concentrated in the urine (Accocella 1967) and the urine is rapidly sterilized Relapse is rare.

Surgery has a decreasing place but care must be taken to ensure that ureteric obstruction does not lead to hydronephrosis Steroids may have a place in management of this condition which can occur during treatment with anti tuberculous drugs The accepted regimen is a trial of prednisolone 20 mg daily for 6 weeks and if successful this should be continued for 12 weeks If this fails then surgical relief is essential to salvage the kidney

Epididymectomy, orchidectomy oophorectomy and salpingectomy are rarely necessary nowadays unless the diagnosis is in doubt The early use of corticosteroids may be indicated to reduce inflammation and prevent sinus formation

(c) *Bone and Joint Tuberculosis* (Griffiths 1975 Kemp 1976)

The most common site for this form of the disease is the spine and much more rarely other bones and joints notably the hip Chemotherapy with streptomycin isoniazid and PAS has been shown to be highly effective (MRC trial 1973ab) No difference was apparent between ambulatory treatment with or without support and treatment with an initial period of bed rest Further trials in Hong Kong MRC (1974) showed a marginally better result using anterior spinal fusion as opposed to simple debridement Experience with pulmonary tuberculosis suggests that short course chemotherapy using ethambutol isoniazid and rifampicin should be highly effective and trials are in progress to resolve this point

(d) *Tuberculous Meningitis*

Early treatment before loss of consciousness is the key to success in this condition (BMJ Leader 1971) Rifampicin achieves only about one tenth of its serum concentration in the CSF whilst pyrazinamide and isoniazid diffuse freely Streptomycin achieves very poor levels and though controversial some would use it intrathecally in a dose of 10-50 mg depending on age A course of 10 such injections is usually considered adequate Forgan Smith *et al* (1973) recommends streptomycin (intrathecally) rifampicin pyrazinamide and isoniazid orally plus streptomycin intramuscularly all in high dosage Continuation treatment should then be with isoniazid and rifampicin (the efficacy of pyrazinamide being markedly reduced without a concurrent aminoglycoside) Most would use steroids in severe disease although their value is unproven

(e) *Tuberculous lymphadenitis* (Iles and Emerson 1974)

The one certain fact in the treatment of this condition is that surgery alone will lead to relapse Surgery should be undertaken only if the diagnosis is in doubt or there is a collection of caseous material In any event anti tuberculous chemotherapy should be

commenced preferably before surgery There is good reason to suppose that a nine month course of treatment with ethambutol isoniazid and rifampicin as in pulmonary tuberculosis should be effective but no controlled trials have been conducted on this point

(I) *Rarer forms of tuberculous infection*

Peritonitis Pericarditis Ileocaecal tuberculosis are rare manifestations and are most frequently seen in this country amongst immigrants Atypical mycobacteria may rarely cause disease Treatment has specialized aspects beyond the scope of this review

Conclusion on Drug Therapy

The regimen of ethambutol rifampicin and isoniazid given for eight weeks and followed by a further 7 months of the last two drugs has proved 100 per cent effective in producing a clinical and bacteriological cure in pulmonary tuberculosis and relapse does not occur The extent of the disease is not a relevant factor It has the advantage of being easy to administer once daily and by mouth Side effects should be few and it obviates the need for a routine audiogram

Although trials have been in pulmonary tuberculosis only it is likely that this therapeutic regimen will also be effective in other forms of the disease

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BOOK REVIEW

BAILEY & LOVE'S SHORT PRACTICE OF SURGERY. Revised by A J Harding Rains and H David Ritchie. 18th edition. Pp 1390. London: H K Lewis £18.00

Bailey & Love after 43 years and seventeen editions and now in the hands of a team of surgeons retains its place as the [illegible] popular textbook. It ranges from undergraduate to Final Fellowship level. This edition retains the familiar style of brief headed paragraphs, many small illustrations and historical footnotes which has always made it interesting and readable.

The content is amazingly comprehensive and remarkably up to date though the problem of multiple authors is exemplified by the chapter on The Spine [illegible]

[illegible]

P C F

Naval Medicine in Scotland

T. P. Oliver

Many Sassenachs (and some Scots) hope that an appointment or draft North of the Border will not feature in their Naval careers. Yet nearly 10 000 such personnel are at present there.

The Navy's presence is concentrated in:

a. The Naval Base at Rosyth which includes *HMS Cochrane* (Flag Officer Scotland and Northern Ireland's Flagship) with its 30 bedded Sick Quarters. HM Dockyard (the SSBN refitting yard), the Headquarters of Captain Fishery Protection and Mine Countermeasures and 2 MCMV Squadrons and the Rosyth Fleet Maintenance Group.

b. The Clyde Submarine Base at Faslane which includes *HMS Neptune* with its 26 bedded Sick Quarters (and is the headquarters of the SSBN (10th Submarine Squadron) and 3rd Submarine Squadron) RNAD Coulport and other support facilities.

c. The Headquarters of 45 Commando Group Royal Marines at Arbroath with its 20 bedded Sick Quarters.

Additionally there are some 20 civilian establishments (Store Pol and armament depots aircraft works) RNR and RMR Units within the Flag Area and several other smaller but none the less important establishments including *HMS Vulcan* at Dounreay with its Submarine prototype reactor.

There is a Naval Air Command Station at *HMS Gannet* and RN Units at both RAF Leuchars and Lossiemouth.

For the Naval Medical Officer there can be a sense of professional isolation from his colleagues serving in the Southern Naval Bases and the Naval Hospitals.

Two years ago, at one of the regular Scottish PMOs meetings it was decided to run what became known as Mini Symposia to enable all the RN Doctors to get together to talk about their everyday work and to enable the younger Medical Officers to have a chance of speaking to an audience. Further it was decided to include both MS and QARNNS officers.

Our first Mini Symposium was hosted by *HMS Cochrane*. The second run by *HMS Neptune* became larger with invitations to the RNR. The third arranged by HM Naval Base escalated further with invitations to the DDMS (Army) and the Chief Petty Officers of the Branch. The fourth from which 2 of the papers are presented in this Journal was the brainchild of the RNR in *HMS Claverhouse* and to which invitations were extended to both the RAMC and RAF Medical Service together with their colleagues of the QARANC and PMRAFNS.

Although all of us have professional contacts with our civilian colleagues, Medical Societies and not least with the Naval Consultants in Orthopaedics and Neuro psychiatry who visit us monthly, the Mini Symposium idea has caught on and we hope to continue to hold these meetings in the future.

Some Aspects of Impotence

D Sutherland Munro

Introduction

When this symposium was first mooted and the question of Papers and Speakers was raised I was a little uncertain on what specific subject a General Practitioner could contribute However whether in jest or in earnest it was suggested that since the symposium was of general interest and since sex was also of general interest then that seemed a suitable subject I must confess this made me think and it occurred to me that a fair number of sexual problems do present in the consulting room Although it was a bit difficult to select which problem I felt the question of Impotence a vital one for several reasons Firstly it is the most common of the male sexual disturbances Secondly as a non consummatory upset it is legally recognised for dissolution of marriage and thirdly because it causes considerable marital discord marital breakdown depression and loss of masculine image

In Victorian times a woman was recognised by Society as a vessel of procreation Her share of sexual happiness was never considered but through the ages views have obviously changed so that now the female partner is recognised as an individual in her own right with an awareness of sex as a means of combining pleasure and mutual commitment Nowadays it is common practice for a wife to come along with the problem of not being able to enjoy sex to the full or as a patient of mine remarked her marshall union couldn t be consumed

Well what of Impotence from the Latin Impotentia which means lack of power so by definition a persistent inability to obtain or sustain penile erection sufficient to conclude satisfactory heterosexual coitus to orgasm and ejaculation

As an illustration I mention Mrs P who summarises many typical problems This lady is 28 married and relevantly childless She had consulted me on several occasions because of an anxiety depressive illness which had not responded to antidepressants and when it became apparent that other circumstances were responsible Eventually she told me of her sexual dilemma increasing frustration anxiety and depression Her husband had little sexual drive no sexual initiative and was unable to make any sort of penetrating effort due to penile flaccidity She further confided that there had been little attempt before their marriage of any sexual approach although he had shown her every other form of love and affection She began to feel increasingly guilty in case her husband s unresponsiveness was of her doing She had become uncertain whether to show sexual initiative or sexual neutrality Tact enquiry from friends and from magazines etc had further increased her unease for she had discovered that many other things could be wrong Specifically she mentioned his possible homosexuality

ill-health infidelity or loss of love for her This combination of circumstances had initiated a persistent reactive anxiety depression

Anatomy and Physiology

At this point a brief revision of these subjects is desirable

The neurological pathways concerned are —

a Erection and ejaculation mediated by parasympathetic nerves from S 2, 3, 4 segments

b Emission of semen into urethra mediated by sympathetic nerves from L 2 3 segments

c Spinal pathways of sexual function ascend in the lateral spinothalamic tract to the thalamus — and descend via median forebrain bundle substantia nigra to the lateral pyramidal tract

d Peripheral autonomic pathways in pelvis concerned with intercourse are similar to those involved in micturition

The endocrine cycle in testicular function can be summarised thus

Aetiology

The aetiology of impotence has always been the subject of all sorts of hilarity and I quote from a rather old textbook which includes a chapter on the subject

Impotence may be premature and excessive venery where such patients are generally singularly fond of talking about their ailments and describing great numbers of beastly minutiae

However I have attempted to make a classification of the causes Table 1 lists the symptomatic causes which need little explanation

The functional causes are

1 *Acute Primary Impotence* which occurs where the disturbance is present from the first act of intercourse The male is frequently anxious and insecure and has a history of childhood neurosis There are often abnormal relationships with the parents against whom much sexual guilt has been developed There are often conflicts of sexual orientation eg Homosexuality and these desires conflict with the more socially accepted heterosexual ones and cause impotence

2 *Acute Secondary Impotence* which occurs in a previously sexually adjusted male where there is often a reaction to physical or psychological factors I have recently interviewed a patient who married an Austrian National Six months after the marriage she became schizophrenic and acute exacerbations of her disturbance frequently followed sexual intercourse Naturally he made all sorts of excuses to avoid intercourse sublimating his normal sexual desires for her The marriage ended in divorce following her confinement in an Austrian Psychiatric Unit He has recently remarried and finds himself impotent

3 *Chronic Secondary Impotence* which is more insidious and associated with reduced sexual drive It is often thought to be a symptom of the controversial male menopause It is frequently brought to the notice in the dolly bird/sugar daddy situation Preoccupation with professional

[illegible] men perpetuate an already failing [illegible] and I have often heard this referred to as the Consultant s or Commander s Impotence In the absence of neurosis or marital stress it is thought to be due to the obscure neuro endocrine changes

Table 1

Symptomatic causes of impotence

1	ORGANIC	(i)	Penile - Hypospadias, Injury, Peyronies Syndrome
		(ii)	Testicular - Maldevelopment, Disease, Removal Starvation States, Atrophy (stilboestrol therapy) Hepatic Cirrhosis
		(iii)	Perineal Prostatectomy
2	ENDOCRINE	(i)	Due to deficient Pituitary Gonadotrophins in lesions of Hypothalamic Pituitary area (Frohlich's, Simmonds')
		(ii)	Diabetes
3	NEUROLOGICAL		Brain tumour, Spinal lesion, Disseminated Sclerosis, Tabes, Injury, Parasympathetic/ Sympathetic lesions (with Micturitional Upset)
4	PHYSICAL ILLNESS		Angina, Severe Dyspnoea
5	ALCOHOL		
6	DRUGS		Guanethidine- Methanidine, Tricylic Anti depressants, Barbiturates, Mono-Amine Oxidase Inhibitors
7	PSYCHIATRIC		Depression, Anxiety, After ECT, Hypochondriasis
8	REACTIONARY	(i)	Disturbed family relationships eg hostility
		(ii)	Threat in a sexual situation - guilt, fear VD, pregnancy
		(iii)	Traumatic early sexual experience
		(iv)	Concealed sexual deviation - homosexuality

of ageing where there is frequently disturbed plasma testosterone and androgen levels

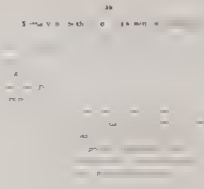
Prognosis

There is an overall poor outlook in the acute primary and the chronic secondary type of impotence whereas the outlook is marginally better in the acute secondary type Prognosis is adversely affected by neurotic constitution by persistence of symptoms beyond two years by poor patient motivation and negative partner attitude It is interesting to note that age has no effect on prognostic outlook

Treatment

Johnson and Masters (1970) have stated that if impotence is psychogenic in aetiology then the remission rate in treated cases does not approach the spontaneous remission rate of neurotic states and it seems no-one has quite explained this In addition it is essential to exclude endocrine and physical abnormality before considering a psychological cause

Some time ago I dealt with a patient of 54 who had been very happily married He and his wife had had intercourse late in the morning before lunch and afterwards had gone to play golf About half way round she complained of severe headache and by the time he got her to the Clubhouse she was unconscious Later that night she died of a subarachnoid haemorrhage Three years after this tragic occurrence he married his secretary a lady some 20 years his junior and found that he had a problem of impotence I concluded that there was adequate psychological trauma to explain his symptoms and after long explanation I thought I had dealt with the situation However nine months later he returned with weight-loss frequency and glycosuria and now that his Diabetes has been treated his problem has resolved and his marriage is extremely happy It is interesting that there



was no evidence of Diabetic Neuropathy

Treatment methods can be considered under the following headings which are summarised in Table 2

1 *Local Treatment* Fortuitously I believe posterior urethral diathermy has been abandoned This was done per urethroscope thereby adding stricture to unrelieved impotence Circumcision specifically to increase glans sensitization has also been given up

2 *Sex Aids* We are very much in the era of sex aid therapy and certainly a trip round Soho will illustrate my point There are a large variety of penile splints available These have a certain success somewhat balanced by a doubtful female unacceptability pattern There are also devices like Blakoe s Ring which is placed in situ at the base of the scrotum In this device there are small galvanic plates incorporated copper on one side zinc on the other which generate minute steady and measurable electric currents and are said to "induce mild vasodilation production of testosterone and mild stimulation of the appropriate sex nerves This device has improved a number of impotent patients There is also a Continental surgical approach of internal penile splinting with plastic or costal cartilage There are also varieties of artificial organs which can be slipped over the impotent one to provide the necessary if

acceptable female satisfaction In addition one can obtain large varieties of complete penile/scrotal prostheses which can be strapped on to the impotent male There does not seem to be any literature which either proves or disproves their glowing claims

3 *Chemotherapy* Throughout the ages there have been available folk medicines and love portions of all sorts eg mandrake roots cantharides Rhinoceros horn The vasodilator alkaloid Yohimbine has had its fashion and has been combined with testosterone strychnine or amylo barbitone The amphetamines once were used and where it is believed tension and depression exist relevant appropriate therapeutic agents can be used

4 *The Male Sex Hormones* This treatment is controversial There is however little hope of improvement by giving testosterone or male androgens where plasma levels are normal In fact this can lead to further disappointment stress and upset of the endocrine chain link Other side effects eg liver intolerance testicular damage and a raised genital carcinoma rate must be considered Suitable response may be achieved in cases of chronic secondary impotence which can be associated with low plasma testosterone and high plasma gonadotrophins by hormones orally or more suitably by injection eg Sustanon 100

I think it is always worth while having the hormone levels estimated despite assay difficulties and expense Unless hormonas are normal psychotherapy is useless

5 *Psychotherapeutic Treatment*

A *Explanation and Education* Many cases of impotence have been caused by distorted facts misinformed literature and inaccurate statements made by those who should know better eg re masturbation and nocturnal emission Often accurate information and reasoned explanation is all that is necessary

B *Individual Psychotherapy* This is helpful where impotence is a serious symptom of personality disorder or neurotic illness Psychoanalysis is of similar value

C *Marital Counselling* This is indicated where impotence is clearly a symptom of disturbed marital relationship The need to resolve hostility and resentment where impotence exists is obvious

D *Hypnosis* It has been shown that reactionary causes of impotence eg fear are often amenable to hypnosis I can illustrate by referring to a young man who developed gonorrhoea in his teens and had been told by friends that he would never really be cured and that this disease would end in impotence After his marriage he displayed great anxiety about this and became impotent Fortuitously this has been relieved by hypnotherapy This technique can be carried one stage further by inducing progressive muscular relaxation by hypnosis and/or tranquilization The patient is relaxed in bed with his partner hopefully his wife who would normally arouse him sexually Intercourse at this stage is prohibited Repeated courses of relaxation/stimulation take place until a sustained erection and self confidence for vaginal penetration have been achieved At the same time discussion often reveals methods of sexual stimulation previously undiscussed or never consciously thought of eg by the use of erotic photographs or literature

by attractive clothing or enticing night attire etc

E *Sex Behaviour Therapy* This technique has been developed by Johnson and Masters (1970) in the United States of America The marital partners are each counselled by a trained Sex Therapist separately and together After a varying number of sessions the couples are encouraged to foreplay often under supervision of the Therapists when it is hoped the man's confidence and potency will be restored and the cause of the disturbance established

In Conclusion

I think much is being achieved to correct this disastrous sexual upset in the male but much research is necessary to reveal many puzzling features

Reference

JOHNSON V E & MASTERS W H (1970) *Human sexual inadequacy* Boston Little Brown & Co

BOOK REVIEWS

JOURNAL OF ADVANCED NURSING Issue 1 Vol 1 January 1976 Oxford Blackwell Scientific Publications Cover £17 00

[illegible] good [illegible] future On [illegible]

[illegible] the Institute of Nursing and the Nursing School [illegible]

M A W P

VOL. II of LEARNING EXPERIENCE GUIDES FOR NURSING STUDENTS A K Roe and M C Sherwood Chichester John Wiley £5 80

As we have [illegible] Vol I it is difficult to assess the value of this programme [illegible] but also with tapes and films

The [illegible] then ask the student think [illegible] of their knowledge and to select their [illegible] for the place checklist [illegible] group [illegible] come

I think [illegible] and no [illegible] and presents [illegible] of learning

M A W P

An Approach to the Problem of Drug Interactions

Brian Whiting

Introduction

Drug response in man depends on the interplay of a number of important variables including age sex genetic factors disease state and drug administration factors such as bioavailability dose route and duration of administration A beneficial response however may not always be obtained Adverse drug reactions form an integral part of modern therapeutics and a small but significant proportion of these adverse reactions can be attributed to drug interactions which may result in increased or decreased therapeutic efficacy or toxicity which may occasionally prove fatal

Drug interaction implies the use of combinations of drugs and a review of the history of medicine indicates that polypharmacy has always been popular Herbal remedies and concoctions of vegetable or animal material contained mixtures of chemicals which were usually administered empirically Little attempt was made to identify individual ingredients and a cure was sufficient in itself Modern analytical and synthetic techniques have produced therapeutic agents which have to a large extent replaced both the former therapeutic empiricism and dependence on Mother Nature Disease can now be treated with powerful specific drugs and knowledge and understanding of drugs and disease should give the physician complete control over the therapeutic substances he prescribes

But even now it is rare for patients to receive only one drug at a time Many surveys of the use of drugs particularly in the hospital environment have highlighted the popularity of multiple drug therapy and outside hospital there is little doubt that polypharmacy is even more widespread The public has ready access to a profusion of over the-counter medical products but little awareness of their inherent dangers Cold and cough cures for example may contain such potent pharmacological agents as antihistamines and sympathomimetic amines which may be implicated in interactions with prescribed drugs Modern marketing and advertising have encouraged the practice of self medication but any purely symptomatic benefit may be gained at the expense of a carefully prescribed therapeutic regimen Both the practice of polypharmacy and the widespread unmonitored self prescription of drugs testify to the accuracy of the observation made by Sir William Osler in 1891 that "a desire to take medicine is perhaps the great feature which distinguishes man from other animals It is obvious that those responsible for drug administration should develop both a critical attitude towards all drug combinations and a greater awareness of their associated problems

Drug Interaction Mechanisms

A number of basic mechanisms are responsible for many drug interactions and an appreciation of these mechanisms can greatly facilitate their interpretation prevention and treatment Interaction can be viewed in terms of the three phases of drug action namely the pharmaceutical phase the pharmacokinetic phase and the pharmacodynamic phase The **pharmaceutical or drug release** phase relates to the physical processes which release the drug in a molecular dispersed form from the pharmaceutical preparation and make it available for absorption The **pharmacokinetic** phase comprises the processes involved in the distribution and elimination of a drug either by [illegible] and determines the level of a drug in the body fluids and tissues The **pharmacodynamic** phase comprises the induction of effect and subsequent response in target tissues Quantative changes reflected as alterations in plasma and tissue concentrations occur during pharmaceutical and pharmacokinetic interactions while qualitative changes at receptor sites modifying onset intensity or duration of action or interference with homeostatic mechanisms occur as a result of interactions in the pharmacodynamic phase

A remarkable number of interactions have now been reported in the literature drawn from experience in laboratory and clinical practice The relevance of much animal and *in vitro* work to the clinical [illegible]

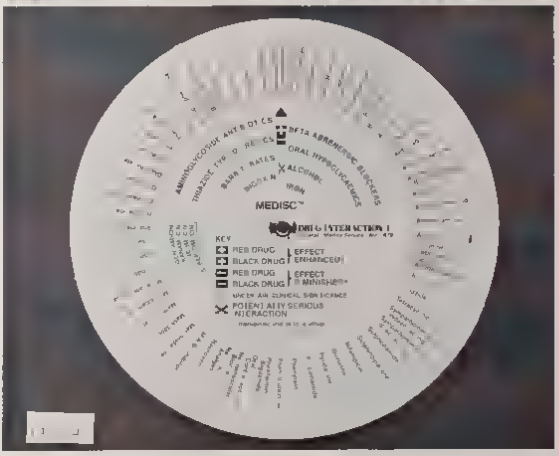


Figure 1: [illegible]

number of well documented drug interactions which have an important bearing on therapeutics Drugs with steep dose response curves or a small therapeutic index are likely to be implicated as well as combinations of drugs exerting a depressant effect on the central nervous system

The Drug Disc (Figs 1a and 1b)

As so many drugs are now available it is becoming increasingly difficult for the practising physician to sustain an awareness of all potential drug interactions With this in mind a drug interaction warning system the Drug Disc has been developed to provide clinically relevant information in a concise and convenient format which can be referred to whenever therapy is prescribed (Whiting Goldberg and Waldie 1973 1974 1975 Whiting and Goldberg 1976) The System consists of a reversible unit of two concentric superimposed discs pivoting freely about their common centre Interactions are indicated by symbols which appear in a window cut into the upper disc when individual drugs or drug categories shown on the two discs are brought into alignment

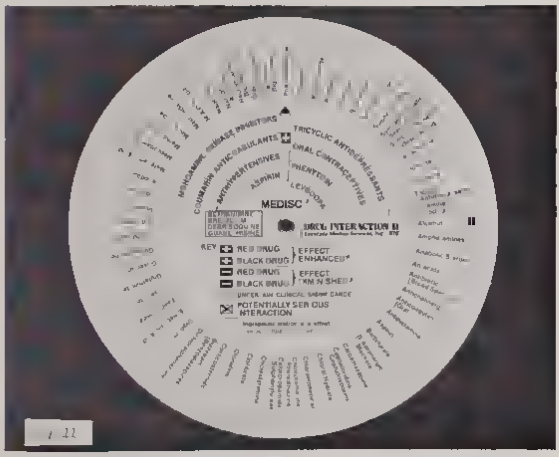


Figure 1b Side II

Drugs on the periphery of the large disc are printed on black (BLACK DRUGS) and the small disc (MONOAMINE OXIDASE INHIBITORS TRICYCLE ANTIDEPRESSANTS) are printed on red (RED DRUGS) The + and − symbols are set against [illegible] background according to the results of a [illegible]

The information presented was designed to embrace the majority of drug interactions which had been shown to have a bearing on therapeutics and the symbols were used to grade interactions according to their degree of clinical significance Thus drug interactions were assigned to one of three categories based on the following broad considerations

1 CLINICALLY SIGNIFICANT INTERACTIONS

(denoted by + and symbols)

Interactions known to alter the pharmacological activity of one or both drugs in a combination either enhancing or diminishing the therapeutic and/or toxic effects of the drugs concerned

2 INTERACTIONS OF UNCERTAIN CLINICAL SIGNIFICANCE

(denoted by a green colour)

Interactions which had not apparently caused any significant harm in man Many such interactions had been demonstrated in *vitro* or in animal experiments but seemed to have little relevance to the clinical situation

3 POTENTIALLY SERIOUS INTERACTIONS

(denoted by a red diagonal cross)

Interactions which were well documented as having caused harmful effects in man resulting from combinations of drugs which should be used with extreme caution if at all

This grading was based on information published about drug interactions on opinions expressed by the developers of the Disc including a Working Party established by the Scottish Home and Health Department and on the opinion of 450 doctors and pharmacists who participated in a trial of the Disc in the United Kingdom This survey of attitudes about the warning system indicated that the majority of participants found the information provided to be both clinically useful and informative Subsequent consumer research in other countries confirmed that the system would be of value both as a practical aid in prescribing and in teaching The degree of interest and enthusiasm stimulated by the Drug Disc showed that drug interactions are an aspect of modern medicine that cannot be ignored and suggested that this kind of aid to prescribing was warranted Distribution of the Disc to selected Health Service doctors in the United Kingdom planned for early 1976 will be followed by more general distribution and worldwide publication by the Excerpta Medica Foundation

Further experience with drug combinations and the introduction of new therapeutic substances will largely determine the future course of drug interactions The Drug Disc will be subjected to constant review and appropriate changes made whenever necessary It is hoped that a system of this kind will foster a more critical approach to multiple drug therapy and help to reduce many of the hazards implicit in drug combinations

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WHITING B GOLDBERG A and WALDIE P S (1974) The Drug Disc A warning system for drug interactions *Drug Ther* 4 Feb 79 82
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The Planning of Haslar

P. D. Gordon Pugh

ABSTRACT

[illegible] number [illegible] plan [illegible] hospital [illegible] plan [illegible] clarke [illegible] the [illegible] Haslar [illegible] hospital [illegible] 6,61

The Introduction of Naval Hospitals

John Evelyn (1620–1706) the virtuoso had as early as 1665 when he was one of the Commissioners of the Sick and Hurt Board urged the need for the Navy to be provided with hospitals of its own. Though accepted in principle the idea never materialised (Lloyd & Coulter 1961).

The First Plan for a Hospital at Portsmouth

A plan which may be seen in the naval Historical Library in London (Fig. 1) is inscribed *A Plan Elevation and Section proposed for an Hospital to contain Sixty five Wards to Lodge 1500 Men with proper Apartments and Lodgings for Officers Nurses and Attendants*. Perusal of this plan which is inscribed on the back in a hand apparently contemporary *Plan of an Hosp[l] at Portm[th] In N. Board Letter 15 June 1741* shows that it was the intention that the hospital should be quadrangular in form and that two opposing sides should consist of a double row of buildings. On 26 October 1741 the Admiralty in response to complaints from various commanders in chief again represented the need for naval hospitals in a memorial. This like the [illegible] of 1665 was also unsuccessful (Lloyd & Coulter 1961).

The Successful Memorial

On 15 September 1744 the Navy Board presented a memorial to His Majesty in Council proposing to build Royal Naval Hospitals at Portsmouth Plymouth and Chatham for the reception and cure of sick and wounded seamen sent on shore from His Majesty's ships. The reasons set forth for such a proposal were that *the want of such hospitals is so sensibly felt and Your Majesty's service suffers so greatly from the loss of seamen either by death or desertion who are sent on shore for the cure of their distempers... that we think it our duty humbly to renew our former application made to Your Majesty on that subject (26 October 1741) upon the frequent complaints that we had received of the great disorders and irregularities committed at the place where the sick men are lodged near Gosport. We ordered Sir John Balchen to send one of his chief Officers to visit the sick men there. He found such a scene of drunkenness as is expressed in the report he made to the Admiral.*

The Want of Royal Hospitals is the cause of the lodgings diet and nursing of sick men being performed by contract a method liable to such abuses as are often fatal to the health of the seamen notwithstanding all the care taken to prevent it. But when the faults of the poor men is considered

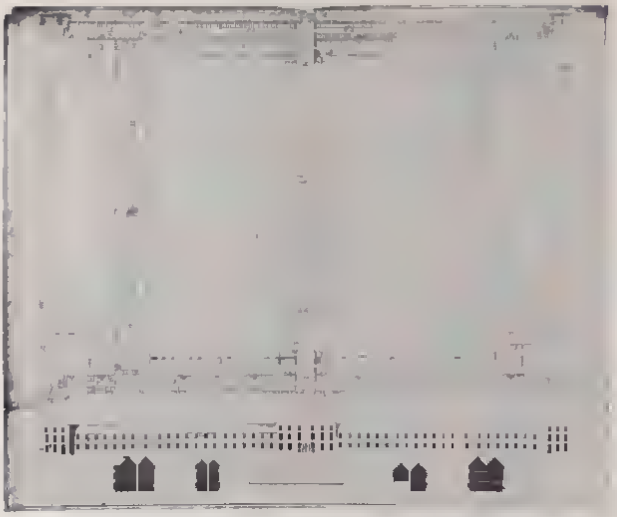


Fig 1 *A Plan Elevation and Section proposed for an Hospital to contain Sixty-five wards to Lodge 1500 Men etc*

Note The plan is inscribed on the back Plan of an Hosp[l] at Portm[h] In N Board Letter 15 June 1741

intoxicating themselves with strong liquors in the height of their distempers the great numbers that are swept away by such intemperance and the desertion of great numbers that recover both compassion to them and the interest of Your Majesty s service requires the putting a speedy stop to an evil of such pernicious consequences which can in no way be effectually done but by building hospitals

If it is thought too great an undertaking to erect hospitals at once at all the three above mentioned ports we do humbly propose that one may be built at the port of Portsmouth capable of receiving 1500 patients which may be completely done for £38 000 as appears by an estimate and plans annexed to the former memorial (Tait 1905)

This was followed by an Order in Council directing naval hospitals to be built at Portsmouth Plymouth and Chatham

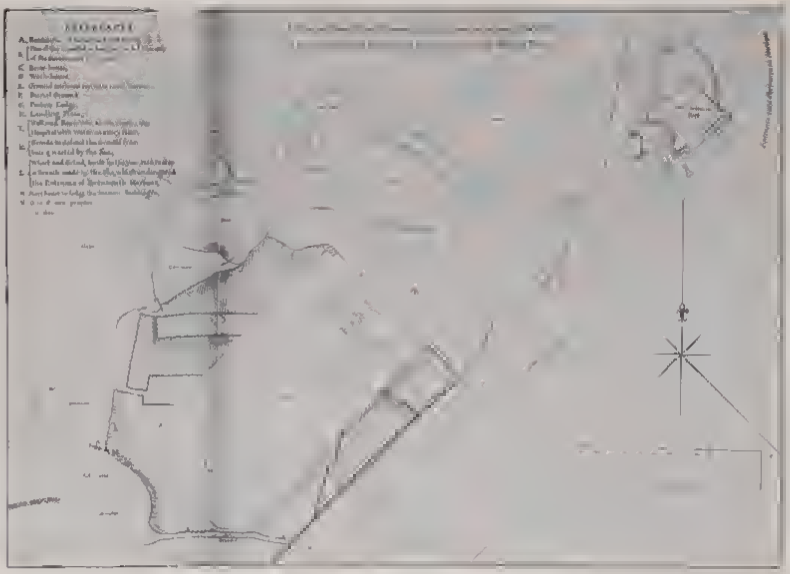


Fig 2 A plan of Haslar Farm Purchased by the Crown in the Year MDCCXLV to Erect an Hospital for Sick and Hurt Seamen of the Royal Navy

Note The plan of the Hospital is as originally designed As it is noted that the N E line only of the Quadrangle is finished this plan must date to 1754 or later

The Site of the Royal Hospital Haslar

It seems that an initial proposal to convert the ruins of Portchester Castle into a hospital at Portsmouth failed to materialize on account of the costs

The site of the Royal Hospital Haslar whose official title since July 1954 has been the *Royal Naval Hospital Haslar* (Pugh 1967) was formerly Haslar Farm purchased by the Crown in 1745 (Fig 2) It is situated on a peninsular piece of land overlooking Portsmouth Harbour and Spithead having at its south west extremity Fort Monckton whilst on its north east point stands Fort Blockhouse guarding the entrance to Portsmouth Harbour In all early plans studied Haslar is spelt *Hasler Hastar* first appears in a plan dated 1799 (Fig 11) Although nowadays Haslar is accepted as being correct a study of my visitors book shows that officers of the Hospital nevertheless not infrequently use the old spelling!

The Architect

After the Reformation and dissolution of the priories and monasteries medical establishments in England must have deteriorated until a large hospital building programme began at the end of the 17th Century Most of the large London hospitals were built between 1700 and 1745 The architect for Haslar therefore had many examples to follow (Lethead 1975)

The original proposal was that the architect should be Sir Jacob Ackwarth (Lloyd & Coulter 1961) in the event it was Theodore Jacobsen who eventually undertook the project

The name of Jacobsen is known chiefly in connection with the Steelyard in Upper Thames Street London now the site of Cannon Street Station (Norman 1907) Jacob Jacobsen son of Peter Jacobsen of Hamburg born in 1619 was appointed House Master or Head Official of the Steelyard in 1647 and died in 1680

His brother Theodore Jacobsen succeeded him and held the position of House Master until 1706 He made over his rights in the Steelyard to his brother s children Jacob and Theodore Jacob married the daughter of Sir Gilbert Heathcote Lord Mayor in 1710 he was knighted in 1718

Theodore brother of Jacob Jacobsen was a merchant carrying on a successful business in the Steelyard in his early days He later resided in Basinghall Street and though actively engaged in commerce found time to practice as an amateur architect His first recorded work was the designing for the East India Company of a new building in Leadenhall Street The erection of the building completed in 1729 was however entrusted to John James a surveyor who was possessed of the technical knowledge necessarily lacking in a busy city merchant

Jacobsen s best known work was the Foundling Hospital (Nichols & Wray 1935) in Bloomsbury This hospital was erected between 1742 and 1752 and demolished in 1928 (Fig 3) Four other architects submitted plans but the fact that Jacobsen offered his gratuitously may have influenced the Governors in his favour The execution of his designs was once more entrusted to a professional surveyor James Horne who also gave his services free of charge

Haslar Hospital is the only other building of note designed by Jacobsen It is not however known how he came to be appointed architect nor to what extent he was involved in the construction or later developments It may be only a coincidence that the financial benefactor of the Foundling Hospital Captain Thomas Coram (1668-1704) was a Sea Captain It is quite likely that in this instance too Jacobsen enlisted the services of a professional surveyor and that a certain John Turner to whom reference will be made twice later was indeed this very

Fig. 3 [illegible] at the Rec[illegible] [illegible] by Basker [illegible]
[illegible]

person

Theodore Jacobsen was a Fellow of the Royal Society of the Society of Arts and an original Fellow of the Society of Antiquaries He died at an advanced age in 1772 and was buried in the family vault at All Hallows His portrait was painted and given by Thos Hudson to the Foundling Hospital (Fig 4)

The Original Design

The original intention of Jacobsen was that the building was to have been quadrangular in form each side of the quadrangle to consist of a double row of buildings one within the other the outside row to be separated from the inside row by a gap of 10 4 metres and the rows intercommunicated at regular intervals (Figs 2 & 5) In the event the south west side was omitted many would say with advantage In general the double block design of Haslar was based on the example of Greenwich Hospital but as will be shown later the original design was much modified between 1746 and 1754 when the front wing was completed

The engraving of the *Royal Hospital Building for Sick and Hurt Seamen at Haslar near Portsmouth* reproduced in Fig 5 is held in the Naval Historical Library It was dedicated to the Earl of Sandwich the First Lord by John Turner It is not known for certain who John Turner was It has been established that he was not an architect, but there is some evidence to suggest that he was a professional surveyor entrusted with the erection of the building In the left hand bottom corner of the engraving is inscribed *Theodore Jacobsen Esqr Architect* and in the right hand bottom corner *Foudrinier Sculp 1750* Another copy of this engraving held in Haslar and taken from the *Gentleman's Magazine* of September 1751 page 400 is additionally inscribed *A Perspective View of the ROYAL HOSPITAL now building for the reception of Sick and Wounded Seamen at Gosport in HANTS The four Centres are intended for a Council Chamber Chapel and two Halls At the four Corners are Apartments for the Officers*

The Opening of the Hospital

Records show that the foundations of the hospital were laid in 1746 based on plans drawn up and approved in 1745 (Lloyd & Coulter 1961) Although the front block of buildings was not completed until 1754 it appears that part of the centre block was ready for occupation a little earlier and such was the urgency for accommodation that on 10 October 1753 The Board of Admiralty issued the order for the admission of up to one hundred patients (Pugh 1967) However the *Minutes of the Council Meetings* held in the Hospital Library only date from 19 December 1755

Fig 2 shows the plan of the Hospital as originally designed but as it is noted that *the N E line only of the Quadrangle is finished* this plan must date to 1754 or later Many points of interest are illustrated for instance the *Well and Reservoir which supply the Hospital with Water on every floor* (I) This South Well was sunk at the time when the foundations of the Hospital were laid and it descended to the first water bearing stratum of sand at a depth of 44 5 metres Water was pumped from it by power provided by a four horse pumping machine The system was not satisfactory and the problem was not solved until a further well lined with cast iron cylinders was sunk to a depth of 103 5 metres nearly a hundred years later Other points of interest are the *Brew house* (C) *Wash house* (D) *Burial Ground* (F) *Porter's Lodge* (G) *Store house to lodge the Seamen's Bedding in* (M) *Guard Room proposed* (N) and *Out door Boggs* (O)

The plan illustrated in Fig 6 has added in manuscript *from Mr Horn 1756* It differs little from the preceding plan except that

Fig. 4. [illegible] *Hospitals*

Note. In [illegible] *Foundling Hospital* [illegible] *Thomas Hudson* 1746. [illegible] *Foundling Hospital* [illegible] *the Thomas Coram Foundation Children*

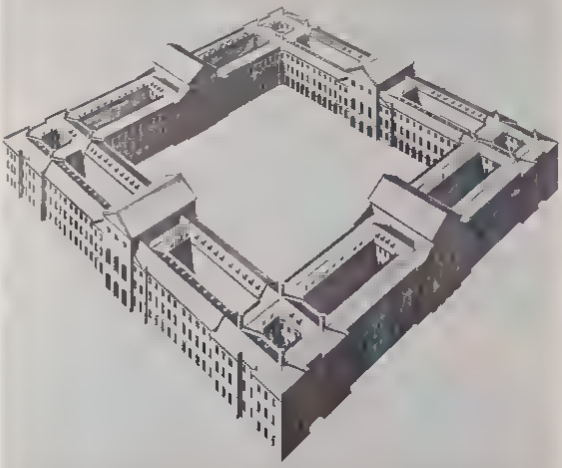


Fig. [illegible] A Perspective View of the Royal Hospital Building, for Sick and Hurt Seamen at Haslar near Gosport

Dedicated to the Earl of Sandwich the First Lord by John Turner it is inscribed Theodore Jacobsen Esqr Architect — Pinxt — Pinxt — Scale 1750 It is noteworthy that the quadrangular building, in excessive in height compared to length maybe this is an indication of Jacobsen's amateur status

only the front line of buildings by then complete is illustrated The Brew house is now a *Guard Room* (C) and interestingly the oldest official residences at Haslar one block to the east in front of the main building and another similarly sited to the west are also drawn in They are known to have been built in 1756 In the former resided the first physician and first surgeon and in the latter the steward and agent Today naval nurses occupy the former and the Medical Officer in Charge and Professor of Naval Medicine the latter These residences are referred to in a pamphlet found pasted on the back of a contemporary frame enclosing an engraving of Haslar executed in 1799 *These were erected by JOHN TURNER ESQ and create a*

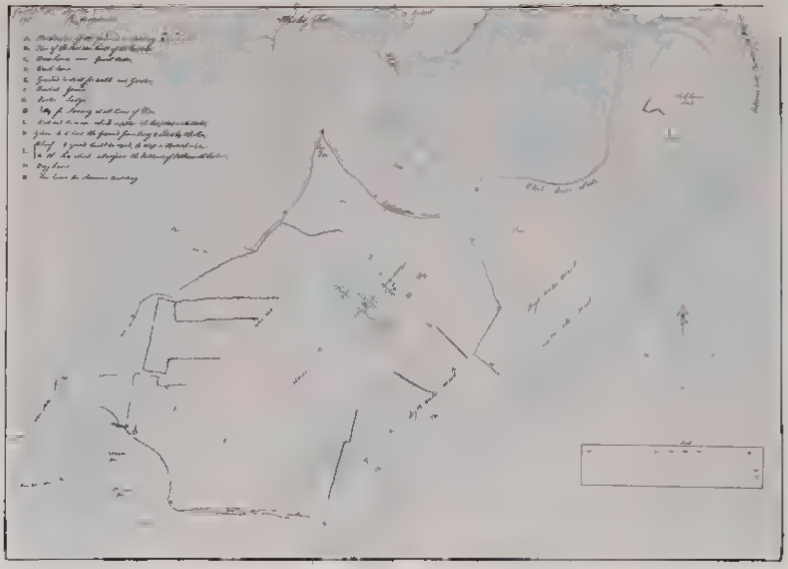
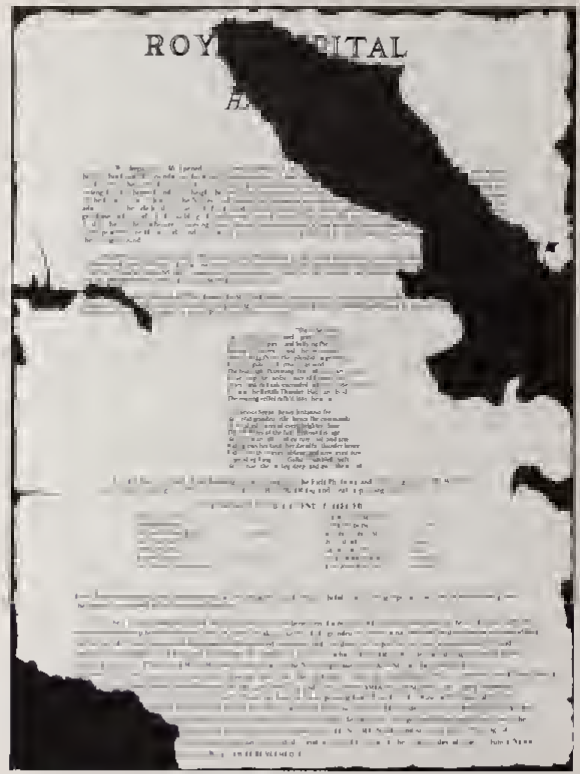


Fig 6 Another plan of Haslar Harbour

Note The plan has added in manuscript from Mr Horn 1756 The plan of the Hospital is confined to the front line of buildings by then complete In addition the oldest official residences at Haslar one block to the north west of the main building and the other to the south-east are also shown on



Pamphlet [illegible] the Royal Hospital at Haslar

Note. This facsimile of a [illegible] and pasted to the back of a contemporary [illegible] from an [illegible] of Haslar by the Rev. J. Hall [illegible] It is a matter of interest. In parts also it provides evidence of the rule planned by J. F. Turner in the building of the Hospital

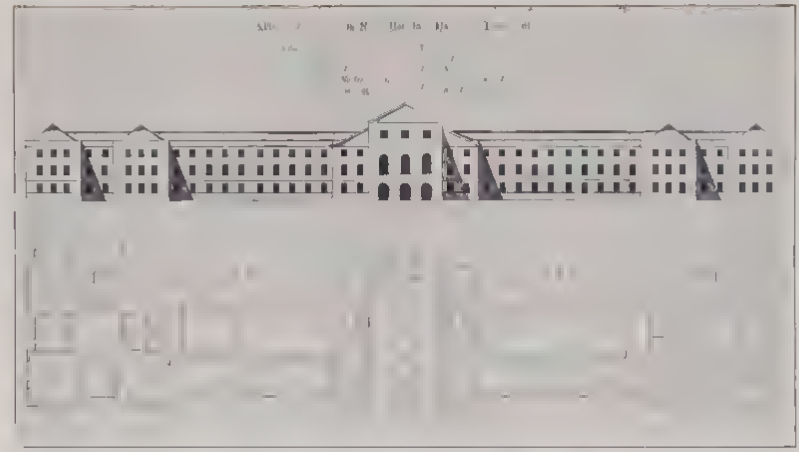


Fig. 8. Plan and Elevation of the Royal Hospital at Haslar (Courtesy Public Record Office)

Note. The term bagehouse is given in Dr. Samuel Johnson's Dictionary (9th Edition, 1805) as watercloset or privy. The change of the use of the word watercloset (Fig. 11) is unlikely to be of significance therefore. The term dispensatory is given in the same dictionary as meaning a pharmacopeia. Presumably in this instance the word has been used mistakenly for dispensary.

pleasing uniformity (Fig 7) This provides further evidence to support the theory already put forward regarding the role played by John Turner in the history of Haslar

The plan illustrated in Fig 8 is of the front of the Hospital, presumably shortly after completion it possibly dates to 1756 and is inscribed *A Plan and Elevation of the Naval Hospital at Hassler* (sic) *near Portsmouth* Apart from the *Physician's Room Dispensatory* and *Agent's Office* it shows the *Wards* (B) *Officers Apartments* (C) *Lobby's and Nurses Rooms* (D) *Stair Cases and Bogg houses* (E) *Little Courts* (F) and *Kitchens* (G) Perusal of Fig 11 which shows a plan of the Hospital dated 1799 followed by an on site inspection gives rise to doubt as to whether the kitchens were in fact completed exactly as shown in Fig 8

Modifications to the Original Design

Fig 9 is a reproduction of another plan held in the Naval Historical Library inscribed *A Plan and Elevation of the South West Front of the Royal Hospital at Haslar showing in Red lines the Additional Wings Ordered to be Built* There is a manuscript addition, presumably in a contemporary hand *pursuant to an Order from the Right honble the Lords Commrs of the Admiralty Dated 24 Feby 1756*

It is the additional wings that are worthy of note for the modifications shown in them never materialized the dining rooms kitchens and wards connecting the double row of buildings were never built The decision seems to have been taken by this time too to abandon the fourth side of the square

The Final Design

In 1967 the author purchased a pair of oval engravings of views of the hospital by the Rev John Hall a former Chaplain to the Hospital in their original frames These engravings were executed in 1799 The pamphlet found on the back of one frame has already been referred to (Fig 7) on the back of the other was pasted *A Plan of the Royal Hospital at HASLAR* by *The Rev J Hall A R Aet 1799* Its condition was extremely poor However it has now proved possible by cleaning the original to decipher enough to produce an exact facsimile of it (Fig 11) Study of this plan shows the design of the wing buildings on completion in 1761 and the purposes for which the various parts of these buildings and the front line of buildings were being used in 1799 Although probably accurate in most respects this plan must be treated with caution for at least one inaccuracy namely in the number of arches comprising each arcade is know to exist

The Physician's Room has now become the *Governor's Room* (B) — the first Governor was appointed in 1795 the Dispensatory is now the *Receiving Room* (M) the *Agent's Office* is similarly sited (D) and the *Steward's Office* is opposite (C) Not only is Hasler now called *Haslar* but the Bogg houses are now called *Water Closets* (K) and the Nurses Rooms are now called *Nurses Cabins* (F)' The *Entrance* (A) *Wards* (E) *Labourer's Hall* (GG) formerly a kitchen the other *Kitchen* (G) *Store Rooms* (H) *Areas* (L) *Chapel* (N) and the *Iron Railing* (O) are also shown

The Terrace

A rather beautiful row of residences was built for the Governor his lieutenants and other officers to the west of the hospital between 1796 and 1798 Today the central residence is occupied by the Surgeon Rear Admiral (Naval Hospitals) and the others by the hospital chaplain some of the

Fig 9 *A Plan and Elevation of the South West Front of the Royal Hospital at Haslar showing in Red lines the Additional Wings Ordered to be Built*

Note There is a manuscript addition pursuant to an Order from the Right honble the Lords Commrs of the Admiralty Dated 24 Feby 1756

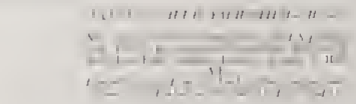


Fig 11 *A Plan of the Royal Hospital at HASLAR*

Note This is a plan first published in the Brit. Medical Journal [illegible] from [illegible] and signed by [illegible] of Haslar with Rear Admiral Hall [illegible] in 1799. The [illegible] Royal Hospital designed [illegible] and [illegible] plan in 1761 and the part [illegible] the [illegible] Pilasar buildings and the [illegible] of Haslar [illegible] in 1794. Haslar although [illegible] the [illegible] arcade


A Plan of the Royal Hospital at (HASLAR)
REFERENCES
A Entrance
B Governor's Room
E Steward's Office
C Apothecary's Office
I Wards
L Nurse's Cabins
O Long Gallery
C Kitchen
H Store Rooms
I Arcade
K Water Closets
L Areas
M Recreating Room
N Chapel
O Iron Railing
NB There are wards over the arcade

[illegible] medical officers and a few of the nursing sisters (Fig 12) The architect was Mr S Bunce a pupil of James Wyatt He worked at Wyatt's offices in Queen Anne Street East from 1786-1791 but is listed as having offices of his own at 25 Queen Street Holborn from 1792 1797 He exhibited at the Royal Academy from 1786 1797

Although these residences present great charm and beauty they were a source of numerous complaints soon after their erection In 1799 the Governor wrote complaining that they were in a shameful state The window sashes were so badly glazed that the rain came through The roof leaked reputedly because the slates did not overlap enough The drains were exceedingly offensive as well as badly constructed The Governor also condemned the locks the leaking taps and various other fittings and called for a survey of the whole of the houses Problems with damp have continued ever since and unfortunately it was found necessary in recent years to pebble dash part of the back of some of the residences (Pugh 1967)

Peripheral Development

At the turn of the last century and the commencement of this new buildings were erected around the periphery of the Hospital These included the officers mess and the sisters mess which were both opened in 1901 the zymotic blocks which were completed in 1902 the sick officers block which was built in 1905 the psychiatric block which opened in 1910 and the sick berth staff quarters now called the medical branch ratings quarters which opened in 1917 Several of these buildings are now used for purposes different from those originally intended

During the Second World War the library and museum were destroyed by bombing although fortunately most of the books and some of the contents of the museum were saved That the damage sustained by the Hospital though grievous was not as great as it might have been has been attributed to the water tower (built in 1885 and 37 metres in height) considered too important a landmark for enemy pilots to want to risk destroying

Future Redevelopment

Since built the Hospital has undergone periodic modernization Particularly has this been so during the last two decades for the Hospital now has staffing equipment and facilities undreamed of even fifteen years ago However even so it is now in the initial throes of a massive and imaginative redevelopment programme affecting staff accommodation and selected clinical areas

Of particular interest having regard to the original plan for a quadrangular building is the proposed Cross Link This will create a new diagnostic and treatment block together with its associated medical records in the centre of the Hospital linked directly with the existing main buildings (Fig 13)

Although the current financial climate has resulted in the indefinite postponement of some of the proposals for the redevelopment of peripheral areas of the hospital work on phase I which includes

Fig 13 *Proposed Redevelopment at Haslar*

Note This photograph is a model prepared by the consultant architects Messrs George Drew Dunn Beckles Wilson and Bower shows in particular the cross link In this complex it is planned to provide the following departments Patients Administration Ear Nose and Throat Department Ophthalmic Department Out patient Clinics Accident and Emergency Department X-ray Department Dental Department and Operating Theatres In the current revised proposal the theatre complex which protrudes to the front of the cross link in this photograph now protrudes to the rear

the new staff quarters and heat source has already begun

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Surgeon Probationers: The young medical students who served in the Royal Navy during the First Great War of 1914-1918.

R S Allison

Part I

Chapter 1

In 1914 at the outbreak of war with Germany the Royal Navy was at the very zenith of its power It possessed the largest battle fleet in the world the most sophisticated weapons and a personnel superbly trained and disciplined to withstand the rigours which were shortly to be placed upon it If a certain complacency of attitude permeated the Admiralty and Parliament this was excusable because of its long ascendancy as the Premier World Navy The sentiment was not universally felt however for even in the years preceding the war leaders like the redoubtable 'Jacky Fisher' the First Sea Lord and his companion later in office Mr Winston Churchill, were insisting on the urgent need for further stepping up in the building programme of dreadnoughts and destroyers to ensure that Britain had a superiority over all other navies in these types of ship especially

No one could forecast of course the shape of coming events or appreciate sufficiently the great part that was to be played in the war by the submarine and the mine Almost everyone assumed that as in the Russo-Japanese conflict of 1904 the fleets of Germany and Britain would engage in prodigious gun battles and that Britain would emerge victorious There was some surprise therefore when the war at sea was ushered in quietly without any major engagement Except for the Falkland Islands the Dogger Bank action and the Battle of Jutland which were to succeed for the most part the war at sea was fought by the small ships i e the destroyers sloops minesweepers and light cruisers which bore the brunt of conflict throughout the four years of hostilities The battleships and battle cruisers were held largely in reserve The morale of their crews remained high however despite the comparative isolation of the chief fleet base at Scapa Flow in the Orkneys although it must have been severely tested at times owing to the long periods of waiting and the lack of opportunity to meet the German High Sea Fleet in action The latter however with the British blockade sapping its vitals was unable to withstand the intense strain with the result that mutiny broke out so that before the end of the war it had lost much of its former power

It has been said that at the commencement of the war the navy was in a magnificent state of preparedness Some authorities may not agree although after nearly a century without a major war it

would have been difficult to anticipate coming events. But one aspect of the Service at least was giving the Admiralty some concern. This was the shortage of medical officers which in the Spring of 1914 was particularly acute because recruiting to the Naval Medical Service was at such a low ebb. Indeed ever since the mid eighties the Naval Medical Service had been allowed to lapse and was only just beginning to recover from the effects of this official neglect. In the Napoleonic Wars of the eighteenth century there had been no dearth of doctors coming forward to join the navy, one of the chief inducements to do so being the prospects of sharing in prize money. This was no small sum and some of the better known naval surgeons taking into the account the allowances they received for taking charge of prisoners-of-war and the sick, together with the prize money, amassed quite a considerable fortune.*

Neither naval surgeons nor surgeon's mates were commissioned officers. They held warrant rank only, occupying a relatively inferior social position in a ship. Many of them had had only an elementary training in medicine following an apprenticeship served before entry to a civilian doctor, but they were all required to pass a test of competency at the College of Surgeons. As Smollett† described this test of knowledge and ability was purely verbal and invariably superficial in character as compared to modern examinations. The successful aspirant depended much on the Admiralty having vacancies at the time for surgeon's mates, but during the Napoleonic Wars there were usually enough to meet the demand.

On board ship the surgeon's mates acted as assistants to the surgeons. They lived on the Orlop deck and their chief duties consisted of dressing wounds, administering *clysters* and treating ulcers and sores (Fig 1).

Many descriptions have been given of these men, the surgeon's mates, many of the accounts suggesting that they were a drunken, profligate body of young men, only a few being conspicuous for their reliability and bravery in action. However, the Admiralty was again to resuscitate the rank in 1914 when it was under pressure because of the low rate of entry of surgeons. In 1904 the navy had an establishment of 594 medical officers, all of them qualified doctors. In that year there were 12 000 officers and men in the fleet. By 1915 this figure had been raised to 146 000. The proportion of serving medical officers however was lower than that of any other great navy and it was apparent that the navy was not offering sufficient inducement to

*Leonard Gillespie was such an example. Beginning as an unqualified surgeon's mate at the age of seventeen he rose ultimately to be Physician to the Mediterranean Fleet under Admiral Lord Nelson and when he retired spent many years attending Paris hospitals and in travel throughout Europe.

†author of *Roderick Random*.

attract young medical men to enter the Service and make it their career Furthermore it was not a question of faint heart for there was no corresponding deficit in recruiting to the Royal Army Medical Corps to which Service there was an abundance of applications for commissions

In July, 1914 the British Medical Association forwarded a report to the Admiralty on the situation in the Navy and the recommendations of their Council for its amelioration In February 1914 Surgeon General A W May who was then the Medical Director General of the Navy had given an address to the medical students of Edinburgh University at which the Principal Sir William Turner, took the chair Surgeon General May admitted that there was probably a stronger feeling among Scottish medical graduates towards the land services than the sea service but it was evident that Scotland was about to become one of the greatest resorts of the navy He remembered the time when it was a rare thing to see a warship larger than a gunboat in the Firth of Forth Now one of the greatest naval ports was to be on the Forth The time was appropriate therefore for the Medical Director General to tell them something about the navy as a service for he personally wished to commend it to them The Surgeon General confessed frankly that his object was to try and persuade more young men to join the Naval Medical Service The navy was short of men at the present time he said One of the chief reasons he thought was that the Naval Medical Service was still being judged by conditions that existed thirty five years ago At that time he admitted the Service was not efficient The medical officers were not up to the mark the standard of nursing in the Service was about tenth rate, the hospitals were fifty years behind in the time in their organisation and equipment He said he wished them to believe that this had all been absolutely altered — to day there existed no finer body of medical men The nurses were second to none and the organization and equipment of the hospital were as fine as any equipment and organization in the world The Service to day was an absolutely efficient living branch of medicine

Another reason for the shortage of medical officers in the navy was he thought that they were not rewarded according to their merits as compared with the army and colonial services A young man was not going to enter a career that was to be a blind alley or that did not offer the reward which he deserved to gain by good work The navy was second to none in the world and it would ill behove the medical profession to be only part of it not to compare with other nations The Medical Director General made a telling point when he referred to the number of ships bearing food and raw materials for manufacture docking in the country Were they to protect these merchant ships by trusting to the goodwill of their neighbours? He thought not and that every reasonable man would agree when he said that the navy was necessary to afford protection in war time for our merchant ships In other words could Britain support its population and provide for the armaments of war and allow itself to be defeated by lack of attention to this aspect? In the subsequent four years of war the truth of this prophesy was to be proved time and time again The Admiralty

were slow to recognise the dangers They were not taken seriously until the war had been in progress some time and the convoy system was introduced

Meanwhile Surgeon General May s speech had been warmly received and the British Medical Association turned its attention to the shortage of medical officers and offered suggestions for the amelioration of the problem It could not altogether endorse the views expressed by the Medical Director and doubted whether he had carried conviction in the minds of his audience that the methods taken had made the Naval Medical Service as efficient as he implied The Dean of the Medical Faculty in Edinburgh in his concluding remarks pointed out that the supply of the right sort of candidate was contingent on the official promise of opportunities in the navy for good professional work and adequate pay When these promises had been given university authorities would be prepared to do for the navy what they were doing for the army and to give freely of their best They should not be satisfied merely to attain numerical parity of medical officers with any other great navy The numbers must be adequate for peace and war and it must be realised that the navy was no longer the pleasant and varied Service it used to be when the country had considerable squadrons on all the seas of the globe

To remedy existing faults in the conditions of service between the Royal Naval Medical Service and the Royal Army Medical Corps several amendments were put forward among which the chief were

1 Separate cabins must be allotted to medical officers on board ship commensurate with their seniority whenever conditions allowed it

2 Naval medical officers were to be granted passages for their wives and children outwards and homewards bound when serving abroad, both when serving on shore stations and at sea

3 As regards their seniority and official position they were to be granted equal authority and rank with combatant officers

4 Previously they had not been permitted to sit on boards or courts martial on members of their own Branch This rule was to be rescinded

5 Specialisation in the navy which had formerly been negligible, was to be encouraged and paid for to bring it into line with the practice of the Royal Army Medical Corps

6 Previously six weeks annual leave had very rarely been granted When serving in home waters three months leave was to be given and abroad, though leave might be more difficult to arrange and where officers would find themselves when working in hospitals doing duty day on and day off for as long as three years without any leave it was to be granted as often as practicable and if necessary could be accumulated once a sufficiency of medical officers had been reached

7 In future the senior medical officer of a ship shore establishment or hospital should preside at boards for the survey of invalids That such a board consisting of commissioned medical officers, should require to be supervised by an executive officer provided in the opinion of British Medical Association was an insult to the medical profession

8 Concessions as regards the right to private practice should be granted to young medical officers in the same lines as the R A M C

9 As regards length of service, the discrepancy in age between the medical and non medical or executive branches should be overcome by promoting surgeons to staff surgeons on completion of six years service, and to fleet surgeons on completion of twelve years' service

10 By Article 1031 of the King's Regulations a medical officer is required to divulge the exact nature of the disease from which an officer or man is suffering to the

captain of a ship or his deputy That the usual professional privilege of secrecy is not granted entails an injury to a doctor s self respect and a loss of his patient s confidence and was not approved

Few higher posts in the naval medical service were available and many officers had been put on half pay merely serving as ornaments to the navy list In the R A M C forty two higher ranks received full pay as compared to nineteen in the navy To give more fleet surgeons a chance of promotion, with higher full and retired pay senior officers could be employed as principal medical officers in barracks dockyards hospitals hospital ships and large training establishments such as Shotley and Whale Island

12 The Medical Director had said in his speech that the sick berth staff was second to none The British Medical Journal added that although second to none in quality they were second to others in quantity and pay and recommended this deserving arm of the Service must not be forgotten when reforms were brought in

Commissioning of Surgeon Probationers

These aims which by certain reforms were promised fulfilled most of the aspirations of naval medical officers, were admirable but coming late in the day they offered no solution to the immediate problem of staffing of the navy with medical officers However the Medical Department and the Admiralty were not slow in devising a scheme for getting over the difficulty In the statement of the First Lord of the Admiralty explaining the "Navy Estimates for 1914" there appeared the following announcement

A new Branch of the Royal Naval Medical Reserve is being formed consisting of Medical Students who have completed a certain portion of their training but are not fully qualified medical practitioners These officers will be styled Surgeon Probationers and it is hoped that they will prove later on a valuable addition to the reserves of Medical Officers

This was a bold step on the part of the Admiralty but it had the full support of the medical profession The Deans of the various medical schools in England Scotland and Ireland did their best to encourage students to volunteer as surgeon probationers for the navy but in creating this rank they had a good precedent and were taking a leaf out of the pages of the seventeenth and eighteenth centuries having in mind the earlier holders of this rank with the difference that they were no longer to be called Surgeons mates They were required to prove themselves *bona fide* medical students and young men of good character The intention was to employ them in the smaller ships of the fleet the supporting vessels such as destroyers sloops assigning to them improved first aid to the wounded and clinical duties at naval hospitals and on board ships besides attending to the transport of the wounded or sick ashore Regulations were drawn up in August 1914 for the entry of surgeon probationers for temporary service under the control of the Medical Department of the navy They were to rank as commissioned officers or sub lieutenants and to wear the usual naval uniform with a single gold stripe having a plain band of scarlet cloth beneath it They were to become members of the Royal Naval Volunteer Reserve and consequently the gold stripe would be wavy or undulating in character and the badge on their uniform caps whilst carrying the insignia of the crown and anchor was to have the letters R N V embroidered over the boss

Applications to serve as surgeon probationers were to be received by the Admiralty and had to be accompanied by certificates of good character physical fitness and evidence that the candidate was a student of a recognised medical school who had passed the second professional

examination in anatomy and physiology Surgeon probationers received full pay and allowances and a uniform allowance When attached to ships they were allowed the ordinary ship's rations but had to pay a small sum towards the maintenance of their mess in the wardroom and they were entitled to pensions and gratuities in respect of injuries they might receive on the basis of awards of a similar kind of other naval officers of corresponding rank As regards the conditions of their service they were required to engage for six months and their liability to serve was limited to five years Later this ruling was amended as follows

(a) Surgeon probationers are to be granted reasonable leave of absence to attend their final examinations (Admiralty Order of January 1st 1915)

(b) If the period of leave granted (which has been fixed at three weeks) is not sufficient the request of a probationer to be demobilized is never to be refused

Further the President of the General Medical Council directed that "in the present emergency it is desirable that the fifth year students now on duty with the fleet should without delay become qualified for commissioned service Their places might be taken by less advanced students who have passed the second professional examination and have received special instruction in 'dressing and in other 'first aid methods of dealing with the wounded Many of these medical students were eager to leave their studies and do service in the war and there was a great response to the opportunity offered of doing six months duty as surgeon probationers in the navy They would thus liberate senior men who have already served for that period or longer and they could expect to be liberated in turn by other students and return to their studies in time to rejoin their original year in medical school or if they preferred taking an extra year graduating in time for the end of the next session

Chapter 2

The immediate result of this Admiralty announcement was most satisfactory In universities and schools in London, the provinces Wales, Scotland and Ireland medical students encouraged by the Deans of their respective faculties began to apply for commissions By the outbreak of war on August 4th 1914 nearly forty names had been enrolled and were published in the Navy List The first surgeon probationer so listed was Eric Lander Caldwell Smith whose date of seniority was 22nd April 1914 Others who had been commissioned before the outbreak of war were Alfred Henry Price (26th June) Edmund Keane (26th June) Alfred G McColl (20th July) John Prestcott Johnson William Tudor Evans, and William Griffiths (29th July) From this modest beginning during the four years of war the number grew steadily so that after four years and the conclusion of hostilities the number of volunteers commissioned as surgeon probationers was twelve hundred This estimate being more of an understatement than the reverse None of these young men had had any previous connection with the Service and were all appointed to the Royal Naval Volunteer Reserve Pending their individual appointment to ships they were listed or attached to base hospital ships such as *H M H S Plassy Soudan Rohilla* All engaged to serve for a minimum period of six to nine months, a few serving for longer before returning to their medical school to complete their studies and become qualified as doctors Whenever possible when first commissioned they were given a short preliminary period of training in a hospital ship at Scapa Flow or at the Royal Naval Hospital Haslar Haslar received the greater number of these and at times when a dozen or more young surgeon probationers were received in a "Batch as often occurred during the war some of them coming from as far afield as Montreal

and Toronto, they were messed together in one of the large wards of the hospital and were made temporary members of the wardroom and entitled to make use of the amenities provided thus being initiated into Service customs and naval routine and being partially prepared for going to sea and not feeling as completely at a loss as they might have done had they come direct from civilian life Considering however the number of students who were drafted to ships without any such preliminary period of instruction they did very well quickly settling down to the routine on board ship and taking their places as part of the ship s company Seasickness was to be expected but few allowed this to become a deterrent One difficulty in many warships, especially destroyers was that of cabin accommodation These ships had not previously carried a doctor or even a sick berth rating It was the coxwain who had assumed responsibility for carrying out such medical arrangements as existed When a surgeon probationer was appointed to a ship he was put in charge of the medical stores and became entirely responsible for the care of the sick and wounded In sloops a cabin was usually available but in the cramped conditions of the destroyer the surgeon probationer had to do with slinging a hammock in the wardroom flat (the passage way between officers cabins) or more commonly having his belongings stowed in drawers under the wardroom settees and using the cushioned settees on which to sleep at night it not being possible for him to do so until the other officers had retired

The Royal Naval Volunteer Reserve which originally had not included surgeon probationers was created in 1903 being divided into Divisions corresponding to the principal ports i e the London *H M S President* the Clyde *H M S Graham* the Bristol *H M S Flying Fox* the Mersey *H M S Eagle* The Sussex Division which had headquarters at Hove and the Tyne, *H M S Calliope* The Ulster Division *H M S Caroline*, was not created until after the war in 1924 The object of the R N V R was to provide a reserve of officers and men to the Royal Navy and was drawn from the civilian population of Britain any experience of shipping and of the sea they had being largely amateur many of the officers being experienced yachtsmen When mobilised on the 2nd August 1914 the R N V R contributed some 4 800 officers and men to the Royal Navy But before the end of the war this number had risen to 5 000 officers and 70 000 men

* * * *

The R N V R contained many fully qualified and experienced doctors in its ranks and through being included in this Branch of the Service the surgeon probationers derived certain advantages in having more senior men to whose help they could turn because a certain number of these were surgeons or physicians and on the staffs of teaching hospitals Among them the foremost was Staff Surgeon R J Willan of the Tyne Division At the time he was a lecturer in clinical surgery in Durham University and a surgeon on the staff of the Royal Victoria Infirmary Newcastle on Tyne He had qualified in medicine with an M B and honours in 1906 having won the Gibb Scholarship in pathology and the Charleton in the Principles and Practices of Medicine When a Division was set up in Newcastle on Tyne he had joined and been a keen volunteer from the start reaching the rank of Staff Surgeon at the outbreak of war He became attached to the hospital ship *Plassy* at Scapa Flow where he had the opportunity of meeting many newly commissioned surgeon probationers from his own school and others and initiated clinical instruction for them whilst they were waiting to be drafted to their respective ships Willan was a superb clinical teacher and had the capacity of drawing the young men to him his informal lectures stressing

their importance as representing the medical profession as a whole and confining his talks to the kind of situations and the complaints they might expect to encounter in small ships when they had no one to rely on other than themselves Willan himself was a prolific and experienced writer who had published many articles for medical journals chiefly relating to the genito urinary system and later became Professor of Surgery in Durham University All his contributions were characterised by sound and practical common sense and later in 1939 the seal of approval was accorded him by his surgical confreres when he was elected a Member of Council of the Royal College of Surgeons of England After the First World War he became Surgeon Captain R N V R and was decorated with the *V R D* the *M V O* and *O B E* During the 1914 18 war whilst serving at Scapa Flow he was appointed Medical Adviser to young Prince Albert then serving as a midshipman in one of the battleships of the Grand Fleet Later of course he was to become King George VI Willan also had occasion to treat the Commander in Chief Admiral Lord Jellicoe and at the conclusion of the war was honoured by being appointed an Honorary Surgeon to King George V

During his lifetime he received many honours During the Second World War he was promoted Surgeon Rear Admiral and made a member of the Naval Medical Consultant Staff He died in 1955 but his memory is still revered by all who knew him and particularly by those who served as surgeon probationers for whom he had been not only their acknowledged mentor but ever their champion

Those who remember him and the manner in which he strove to improve the contribution made by the surgeon probationers still bless him for the slim volume which he published under the auspices of the Admiralty * "Clinical Notes for Surgeon Probationers R N V R" The writer who has been a teacher of medical students for some thirty five years can recall no other book of the period which contained so much valuable and sound advice condensed into so few pages It was designed exclusively for young medical students who faced with a certain amount of responsibility and being alone in their respective ships had it alone to draw on for clinical advice and of all his writings in compiling this modest brief work one feels he achieved his finest hour The little book reveals his inspiration as a teacher and deserves a place among the great works of the past In the preface he states

This book owes its origin to a series of clinical lectures and demonstrations which I was asked to give to Surgeon Probationers in the Royal Naval Hospital Ship Plassy at a Naval Base My endeavour aimed at the student acquiring some practical well digested information rather than have him go away with an undigested medley of knowledge which would be of little use to him as a Surgeon Probationer The diseases dealt with are the ones they are ordinarily liable to meet in a man of Naval Rating age i e between 16 and 38) upon ships of a size which carry a Surgeon Probationer Part I deals with acute abdominal emergencies while some other ailments are referred to in Part II

A typical case is one where the disease follows a certain course and presents definite symptoms and signs An atypical case is one which fails to follow the normal course when one or more of the ordinary symptoms or signs may be absent or replaced by others I have only dealt with typical cases but remember that there are exceptions to every rule only that the exceptions are uncommon Also remember that these Notes are purposely incomplete for only the main features are mentioned if they were complete they would be too voluminous to be useful They are intended as Guide Posts only for a Surgeon

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Probationer of limited experience As the junior student gathers knowledge he must make the necessary additions for himself

When examining a case the student should give himself every chance by only making an examination under the best possible conditions e g a good light and a full view Wherever there is a chance of comparing the normal with the abnormal always do so e g in a case of knee joint trouble fully expose both knees and compare the normal with the diseased one It is quite true that there may be no facilities in his ship for examining urine staining microscopic slides &c some are as yet unskilled with a stethoscope some cannot yet estimate any alteration in the vocal fremitus yet even the junior hospital student can make out a great deal if he will only try without such aids or knowledge It is a well known fact that in doctoring mistakes are usually not made through lack of knowledge but through a failure to adequately examine the patient

The Surgeon Probationer should always endeavour to obtain the services of a Surgeon in any case of sickness In civil life the successful Practitioner is the one who does not consider it an indignity to have a second opinion about a case If the Surgeon Probationer is really interested in his work he will make it a point of honour to thoroughly learn all the symptoms and signs of his case also to arrive at some diagnosis At the consultation with the Surgeon he will have his various points confirmed or refuted and he is so much the richer for knowledge which he will have acquired

It must be emphasized that the prescriptions &c given are only to be used when a Surgeon is not available for a consultation

In the first part of the book the writer deals with the acute abdominal diseases likely to be met with in a person of naval rating age and include the clinical investigation of such a case together with aids for arriving at a diagnosis of acute abdominal emergencies Thus under SYMPTOMS (i e the History of the Case) the need to evaluate the mode of onset whether by acute pain vomiting rigor or shock and (2) if an accident what happened exactly Under PAIN (1) Its situation — at onset and afterwards (2) If continuous or spasmodic (3) Its relation to food (4) If made worse on deep inspiration Under VOMITING — Its character and force Under BOWELS AND PASSAGE OF FLATUS — (1) When were the bowels moved last (2) When was flatus passed last (3) The rectal questions refer to (1) Pain (2) Prolapse (3) Discharge (4) Defaecation Under MICTURITION — The urinary questions refer to — (1) Frequency of micturition (2) Pain in relation to micturition (3) Character of the stream (4) Character of the urine Has he any COUGH ?

This is followed by an exact account of how the surgeon probationer should examine the patient noting first the pulse rate temperature state of the tongue respiration and urine In inspecting the belly the surgeon probationer was advised to spend some time looking at it noting whether it moved freely on respiration and if any visible audible or palpable peristalysis was to be seen On palpation he was to be careful not to neglect the hernial sites and to note any localised rigidity of the belly wall or particular area of tenderness Next he was to make use of percussion over the tender area and the flanks for signs of free fluid in the peritoneal cavity and always without exception to confirm the position of the heart apex beat in the left fourth intercostal space half an inch internal to the nipple line He should also describe the heart and breath sounds not forgetting to make sure that the knee jerks were present that there was no tenderness on palpation over the epididymis or anything abnormal (e g in the way of impacted faeces or tumour) in the rectum

Other sections dealt with the principal

aspects of acute appendicitis, ruptured gastric or duodenal ulcer, acute general peritonitis, acute gastritis, intestinal obstruction, renal calculus, intestinal colic, acute pneumonia, acute pleurisy, acute dilatation of the heart, simulating an acute abdominal lesion, acute pyelitis with inflamed ureters, simulating appendicitis, acute epididymitis, tabes dorsalis with gastric crises, internal bleeding from a ruptured viscus or from a large blood vessel, ruptured bladder, fractured ribs, acute infectious fevers. Willan stressed the necessity, which many other writers failed to mention, of recording not only the symptoms and signs that were present in a given case but what were not. For example in recognising acute appendicitis it was important to note that there was no difficulty in the passage of flatus, that the hernial sites were normal and that there was no tenderness or pain in the posterior renal area, a normal rectum, heart and breath sounds, urine, testes, and knee jerks.

In general symptoms and signs were classified as those which were present and those which were normal.

Nine out of ten cases of ruptured viscus (e.g. a ruptured gastric or duodenal ulcer) which are operated upon within twelve hours of the perforation should recover. After this time has been allowed to elapse the chances of the patient's recovery lessens with every hour which passed by without the operation being done. In acute intestinal obstruction the cause must be promptly dealt with by operation, otherwise the outlook is grave.

'To give Opium in any form to a patient complaining of acute abdominal pain, is an absolutely criminal procedure on the part of the Doctor unless he has made a diagnosis.

It sometimes requires great courage on the part of the medical man to refuse opium to a patient (who knows its virtues, and who is perhaps constantly clamouring for relief from his acute pain) where the cause of the pain has not been ascertained. The opium masks symptoms, and before its comforting effect has passed off the patient may be moribund.

It is not always a safe procedure giving a purgative where acute abdominal pain is complained of; it is sometimes sufficient to cause a rupture of the acutely inflamed distended vermiform appendix.

Acute abdominal emergencies were not the only matters dealt with in this little book. For example, under the title of "THE SHIP'S PAINTER" the need to consider lead poisoning should be borne in mind in men complaining of obstinate constipation or colicky abdominal pain, particularly when they showed the characteristic blue line in the gums. SKIN DISEASES came in for much attention. It was important, especially in connection with the recognition of pediculosis and scabies, outbreaks of which were liable to occur in small ships where there were no bathing facilities for the ratings, and officers had to make do with a tin bath and a jug of hot water. A description was given of the skin rashes found in the common infectious diseases and the need for bacteriological examination of the throat swab was emphasized when the question of diphtheria arose. This was followed by a brief account of the examination of a man found unconscious and a list of the common causes. In the case of FITS it is suggested the most probable cause was epilepsy, although in the absence of incontinence of urine or faeces a diagnosis of hysteria will probably be correct. A good comparison between a patient with concussion of the brain and another with compression was given and the book ended with a brief description of the signs of DEATH. As it happened this proved especially valuable in September, 1918 during the terrible influenza epidemic when I was called on board the destroyer *H.M.S. Ruby* which was lying alongside my ship in Brindisi at the time. A stoker had just collapsed whilst

at work on the upper deck, and although he lay motionless and was intensely cyanosed, respiration had ceased but the heart was still beating. Together with another surgeon probationer I gave artificial respiration, but without effect although we pursued the treatment for a full half hour when by this time neither the apex beat nor the heart sounds were audible and we were forced to conclude that the man was dead At the time it did not strike us as being very unusual that the cessation of respiration had preceded stoppage of the heart and been accompanied by intense cyanosis In short it appeared likely that the man must have had an expanding lesion in the posterior part of his brain or cerebellum

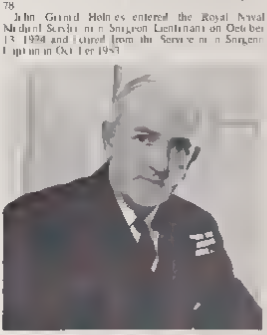
To be continued

SERVICE NEWS

OBITUARIES

SURGEON CAPTAIN J. G. HOLMES OBE MA MB BN Retd died on March 11 1976 at the age of 78.

John Gerrard Holmes entered the Royal Naval Medical Service as a Surgeon Lieutenant on October 13 1924 and retired from the Service as a Surgeon Captain in October 1953.



[illegible] *OBE*

[illegible]

Jerry was [illegible] He qualified [illegible] took his MB [illegible] He had now will [illegible] establishment [illegible] Service [illegible] Chinese [illegible] *Barebell* [illegible] Flight Commander Aircraft Carrier *Campeador* [illegible] British Commander *R*[illegible] [illegible] he served in battleships in Chatham and Hong Kong and hospitals in Bermuda Chatham Stadium Hill Lee and Fort Edgar and finally as MOIC [illegible] Mitchell Stubbs and Helping [illegible] the Inland [illegible] Royal Naval Medical Service at the Royal Naval Medical School Whale on [illegible] street [illegible] drill.

Jerry was [illegible] man an excellent [illegible] MOIC of the Medical School [illegible] battle [illegible] will [illegible] kept the school from [illegible] during [illegible] Service established [illegible] period he [illegible] Sempre [illegible] [illegible] by Kalling [illegible] academic.

He was [illegible] welfare and [illegible] Investigation at the Royal Dockyard Dockyard School Faffield. He also gave [illegible] Brigade nurses and St John Ambulance Brigades in various parts of the country. He was [illegible] master of his subject [illegible] responsible [illegible] sense of humour.

He was awarded *OBE* in 1943 was awarded the Gilbert Blanc Medal in 1953 and was a Fellow of the Royal Society of Medicine. We mourn an fine gentleman scholar and loyal friend.

SURGEON CAPTAIN B. WATERS, MRCS LRCP DO RN died on March 7 1976 at the age of 80.

Brian Waters entered the Royal Naval Medical Service as a Surgeon Lieutenant on June 21 1921. He became a Surgeon Specialist in Ophthalmology in 1962 and was promoted to Surgeon Captain on December 31 1972.

Surgeon Rear Admiral A. O. Gunner MVO writes

The sad news of the death of Brian Waters will have [illegible] to all who knew him, many of whom had formed lasting friendships that had nothing to do with the scheme of the Navy. For he was a man with wide interests. He was known universally as a perfectionist in everything he did whether it was in connection with his private clinical practice or purely administrative work in which he was one of his many hobbies. In all these fields he achieved a standard of excellence which all

could combine [illegible] few and [illegible] very few who served with [illegible] time asked him to [illegible] and [illegible] help us in [illegible] and whatever he was asked.

It was from that [illegible] would have been affected [illegible] which kept him [illegible] to take [illegible] surgery either [illegible] hands watches and [illegible] to burn.

His second [illegible] appointment was [illegible] Dartmouth from [illegible] on each [illegible]

Honours for those who knew him [illegible] remembered but rather [illegible] deep sense of loyalty [illegible] his friends and which [illegible] everything he [illegible] next sweetness.

He leaves a wife and [illegible] deepest sympathy but [illegible] comforted by the knowledge that [illegible] shared.

SURGEON CAPTAIN I. C. MACDONALD CBE MD ChB FRCP(Ed) FRFPS(G) RN Retd died on February 2 1976 at the age of 69.

Ian Campbell MacDonald was born on November 19 1906 in Argyllshire. He graduated from Edinburgh University in 1929 and joined the Royal Naval Medical Service as a Surgeon Lieutenant on October 16 1936 returning as a Surgeon Captain in November 1973.

He served in *HMS Fulmar* 1939 to 1940 and in the Royal Naval Hospital Malta during the siege of 1941-2. After appointments at *HMS Daedalus* RNAH Ingersoll and he proceeded to RNAH Mombasa in 1944 and RN Barracks Kilindini in 1945. Further appointments included *HMS Ganges HMS Superb* and the Royal Naval Hospitals Chatham Malta and Haslar which he served as SMO(M) from 1960 to 1963.

Surgeon Captain MacDonald was the first medical officer in the Royal Navy to receive the status of Consultant Physician. He was made CBE in 1963. Following his retirement he continued as a civilian consultant until 1971 when he returned home to Scotland.

We extend our sincere sympathy to Mrs Mollie MacDonald and their three sons.

Surgeon Captain G. J. Milton Thompson writes

I remember Ian MacDonald as Medical Specialist in RN Hospital Chatham from 1958 to 1959 when his practical wisdom, questioning mind and sense of humour made him an ideal mentor. He had a profound knowledge of sailors and their medical problems and was forthcoming with those whose inexperience led them into error. His heart was not in administration although his disregard for red tape was refreshing to his juniors and he was less happy as SMO(M) at Haslar than as a full time practising physician. Those naval physicians who were privileged to sit at his feet will remember him with gratitude and affection.

SURGEON COMMANDER (D) M. E. P. EASTON LDS. RCS RN died on February 7 1976 at the age of 53.

Michael Eastwood Tom RN Harley after a relatively short illness. He was a very gentle man who was devoted to his wife and sons and was deeply respected by all who had met him.

Michael qualified at Guy's Hospital in 1946 and joined the Royal Navy as an RNVR officer in July of that year. He transferred to a Short Service Commission in 1949 and was accepted into the Permanent List in 1953. His promotion to Surgeon Lieutenant Commander (D) followed in 1954 and to Surgeon Commander (D) in 1961.

During his long service of some 30 years Michael served in many ships and establishments both at home and abroad. While serving in the Royal Naval Barracks Chatham between 1958 and 1959 he became engaged to Margaret Bailey who was then a Dental Surgeon Assistant in the WRNS and was serving there. Their marriage took place on April 1 1954.

By an irony of fate Michael's last appointment in the Royal Naval Barracks again at Chatham where he was appointed as the Senior Dental Surgeon to Flag Officer Medway in August 1974.

His funeral service took place in the Chapel RNS Pembroke in February in the large congregation of officers and ratings testified to the very high regard in which he was held.

We offer our deepest sympathy to his wife Margaret and to his sons.

SURGEON COMMANDER THE HON. ANTONY CATHORNE CATHORNE HARDY MB ChB RN Retd died on April 21 1976. He was 68.

Antony Cathorne Hardy entered the Royal Naval Medical Service as a Temporary Surgeon Lieutenant RNVR in October 1939. He transferred to the Regular Navy in 1946 and was placed on the Retired List as a Surgeon Commander on August 1962.

He served in *HMS Carnatic Wolfe Dragon* and *Newcastle* during the war years and as Naval Medical Officer Durban in 1945. In 1946 he began an association with the Fleet Air Arm which continued until 1959. During this time he served in *HMS Hornbill Heron Condor Triumph* and *Centaur* and as Staff Medical Officer to Flag Officer Flying Training.

SURGEON COMMANDER P. J. A. THE O'ROURKE LRCP LRCS RN Retd died in February 10 1976 at the age of 77.

Patrick Joseph Alfred The O'Rourke joined the Royal Naval Medical Service as a Surgeon Lieutenant in December 13 1922 and was placed on the Retired List as Surgeon Commander on April 19 1953.

His appointments included HMS Sultan RNH Chatham *HMS Dolphin Yarmouth Compass* RNH Malta *HMS Hornbill Emerald Drake Eagle Dauntless Mound Garuda* RNAS Stretchwater and Culdrose and as PMO at RN Barracks Portsmouth from 1949 to 1953.

SURGEON LIEUTENANT-COMMANDER W G GILL MB MCh FRCS LRCP RNVR died suddenly in March 29 1971 He was 68

William Gill joined the Royal Naval Medical Service as Surgeon Lieutenant RNVR in February 1935 and was released as a Surgeon Lieutenant Commander in April 1946 He served in RN Hospitals Haslar Plymouth Alexandria Mimerne Magna and Nuwara Abbas and in HM Hospital Ships Atlantis and Vienna Twice mentioned in despatches he also was awarded in 1941 while at Tobruk

After release from the Service Mr Gill was appointed consultant surgeon in the Royal Surrey County and St Luke's Hospitals at Guildford Sailing was his great pleasure and in 1956 he made a double Atlantic crossing with a friend

Any personal recollections of the above officers would be welcomed by the Editor for publication in his forthcoming issues of the Journal

APPOINTMENT

Medical Officer in-Charge Royal Naval Hospital Haslar on May 4 1976 **Surgeon Captain F A F Mackenzie** MB ChB DMRD FRCR

Surgeon Captain [illegible] Red Eng [illegible]

HIGHER QUALIFICATIONS AND AWARDS

Surgeon Rear Admiral J S P Rawlins — FFCM
Surgeon Commodore J A B Harris — FRCR
Surgeon Lieutenant Commander M A White — FRCS(Ed)
Surgeon Lieutenant R J Leicester — FRCS(Ed) FRCS(Eng)
Surgeon Lieutenant A J Johnson — DMRD
Surgeon Lieutenant W Edmonds — DA
Surgeon Lieutenant C G Dixon — DOHaRCOG

PROMOTIONS

To Surgeon Lieutenant Commander C S M Hallam M C Monk J R Barsham
To Surgeon Lieutenant P H Cooper
To Surgeon Lieutenant (D) D C C Alexander G H Holmes
To Acting Surgeon Lieutenant A J F McEwan

Provisional selections for promotion to date December 31, 1976

To Surgeon Captain J H Sewart, A F Davidson T P Oliver L C Banks
To Surgeon Commander A E Marsh B M Adams M J Bailey
To Surgeon Commander (D) P G Edwards.

NEW ENTRIES

Surgeon Lieutenant Commander R D Curr
Surgeon Lieutenants Diane C Croft M A Farquharson Roberts B G J Green
Surgeon Sub Lieutenants R E M Waugh P J Clarke
Surgeon Sub Lieutenant (D) H D Rushton

TRANSFERRED TO 36 YEAR PENSIONABLE COMMISSION

Surgeon Lieutenant C J Orchard

RETIREMENTS

Surgeon Captain R H Broughton A P M Nicol CBE MVO S V Jones, QHS D C McNinn
Surgeon Commander E H P Warbinton J C Twomey J F Rivers
Surgeon Commander (D) G K Wray

TERMINATION OF SHORT SERVICE COMMISSION

Surgeon Lieutenant Commander C S M Hallam M A White J F Wollaston R M Page
Surgeon Lieutenant H Warren T M Wadsworth R M Harold

VISIT TO THE INSTITUTE OF NAVAL MEDICINE BY THE CHIEF OF NAVAL STAFF AND FIRST SEA LORD

Surgeon Rear Admiral [illegible] OBE QHS (MOD) [illegible] Sea Lord and Admiral of the Fleet CCB DSC [illegible] January 21 1976

MEDICAL SERVICE OFFICERS

PROMOTIONS

To Lieutenant Commander M G Harper
To Lieutenant R A Pollard C R Barker P R Wellings

RETIREMENT

Lieutenant Commander H E J Davies MBE

Diploma in Health Services Administration
Lieutenant Commander J Hammond

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

PROMOTIONS

Matron in Chief
Miss Patricia Gould RRC

On [illegible] Matron [illegible] QARNNS [illegible]

NEW ENTRIES

Nursing Sisters

Miss J H G Wykstra M J Capel E O [illegible] L A Johnson M Perry

Quarters Officers

Misses S M Brown J O Gothan

RETIREMENT

Matron in Chief
Miss Cynthia J J Cooke CBE RRC QHNS after 33 years service in the QARNNS

RETIRED MEDICAL OFFICERS

Surgeon Captain T L Cleave has been elected FRCP

Surgeon Commander J R Kirkpatrick has been appointed as Professor of Surgery in the University of Manitoba

ROYAL NAVAL RESERVE

PROMOTIONS

Lieutenant Commander (D) [illegible] V B [illegible] P C A [illegible]

RETIREMENTS

Surgeon Lieutenant Commander W [illegible] M [illegible] Indoe
B Mason
Surgeon Lieutenant Commander (D) C [illegible]

INTER SERVICE RUGBY

RN MEDICAL SERVICES v ROYAL ARMY MEDICAL CORPS

On February 25 1976 at the US Ground Portsmouth the Royal Navy s Medical Services rugby team met a team from the Royal Army Medical and Dental Corps in the first of what is hoped will be an annual Tri Service event The Navy won 19-9

From left to right CMT Wynn Lieutenant (MS) [illegible] Sub Lieutenant (MS) Barker PMT Mugridge PMT Neil Surgeon Lieutenant Cooper Lieutenant (MS) Shine Lieutenant (MS) Pollard PMT Tinston LMA Butterfield POMA Chapman CPOMA Burns Chief PT Rogwall PMT Edwards LMA Brooking PMT Sexton PMT Williams LMA Thomas PMT Kay POMA [illegible] PMT Wright.

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NOTICE

POMA H. M. Talbot and Dr D. J. Harris shortly before completing a 21 day saturation dive in the experimental pressure chamber at the Royal Naval Physiological Laboratory, Alverstoke. During this dive seven days were spent at pressure equivalent to 300 metres sea water. This dive was the sixth in a series designed to explore many of the complex physiological and biochemical changes inherent upon exposure to high pressure. In all Fifty various psychometric tests were carried out to increase the knowledge of man's performance at such pressures.

Editorial

The contents of this issue of the Journal emphasise the unique character of the Royal Naval Medical Service as a microcosm of the practice of medicine Some inkling of the broad field of responsibility which the Service is required to cover is obtained from these and as a corollary to this the necessity for specialisation and sub specialisation within a comparatively small professional body

On the clinical side there are references to advances and techniques of radiological and laboratory diagnosis Some environmental hazards of a sea going occupation and the need in so many branches for unimpaired auditory acuity account for the aggressive policy adopted in respect of repair of perforations of the tympanic membrane The experience of those practising in this field in the Navy is perhaps unsurpassed elsewhere In a medical service orientated towards the expectation of dealing with trauma from whatever cause the need for facio-maxillary specialists is obvious The regular appearance in the Journal of contributions in this field is welcome evidence of expertise and experience

Another potential hazard of maritime occupation is exposure and immersion The complication of hypothermia as an accompaniment of both has brought considerable advance in the recognition of its risks and in its management A further contribution on the subject adds perspective and points the way to possible progress

The ingenuities of medical engineering in the production of prostheses is highlighted by an article on replacement of the shot-out joint a subject appropriate to the environment of the Armed Forces Non reactive materials and antibiotics have revolutionised the definitive secondary treatment of such injuries with the possibility of preventing much potential disability It is however salutary that side by side with this article there is one which needfully stresses the first principles of surgical management of the contaminated wound so typical of missile and other injuries in the field The reiteration of adequate cleansing and debridement decompression preservation of blood supply and delayed wound closure as the only means of first surgical treatment in these circumstances is timely bearing in mind the disastrous consequences of neglect of these principles at the outset of each successive major armed conflict of this century It is of additional interest that Naval Medical history indicates awareness of the proper management of such injuries some 200 years ago

The account of the Surgeon Probationers of the First World War in both this and the last issue of the Journal provides interesting historical information on a notable facet of the more recent history of the Royal Naval Medical Service Many of these young undergraduates in medicine who enlisted as Surgeon Probationers subsequently went on to distinguished careers and included at least one President of the Royal College of Surgeons of England The Surgeon Sub-Lieutenant of today therefore has predecessors worthy of his knowledge and we are grateful to Dr Allison for his contribution on this subject

Delayed Wound Closure*

Sir James Watt

ABSTRACT

Although first practised by a naval surgeon during the Crimean War, the principles of delayed wound closure have had to be relearned in every subsequent conflict. Recent studies of missile ballistics have revealed their potential for extensive tissue injury and widespread contamination beyond the limits of the visible track. Radical wound debridement with delayed wound closure at the optimal time are mandatory.

Introduction

The two innovations of the late 19th Century which changed the course of surgery were Lister's antiseptic principles and the aseptic techniques developed by Spencer Wells, Halsted and others. They led to a remarkable reduction in the rate of sepsis following operations and the World War I surgeon was therefore totally unprepared for the catastrophically high incidence of wound sepsis during the early months of the War which included streptococcal septicaemia, tetanus and gas gangrene. Matheson (1968) puts the incidence of gas gangrene at between 10 and 12 per cent of all wounded with a mortality of 22 per cent and suggests that it was probably the highest in history. It soon became evident that the extensive tissue damage caused by high velocity missiles, retained foreign bodies and the impairment of the blood supply to the part either through initial injury or subsequent restrictive dressings or plasters, provided optimal conditions for the spread of infection. Primary suture severely aggravated the condition and increased tissue tension. Although wound debridement had been practised by naval surgeons John Woodall in 1617 and John Atkins in 1742, their writings were ignored and it was only after the alarming sepsis rate following primary suture in World War I that wide initial debridement with maintenance of a good blood supply became the rule and delayed wound closure was undertaken between 3 and 7 days later, a principle first applied in 1854 by George MacKay, Surgeon of HMS *Agamemnon* at Sevastopol (Woodall, 1617; Atkins, 1742; MacKay, 1854).

The incidence of sepsis fell dramatically but the lesson had to be relearned in the Second World War by surgeons who had placed their faith in the sulphonamides. In the Korean War, surgeons were now depending upon penicillin to permit primary wound closure and Latta (1951) reported that 12 per cent of 410 cases received in the Royal Navy's hospital ship *Maine* required further surgical treatment on board, either because of inadequate debridement or primary suture or both, and

This article is based upon a paper read before the Royal College of Surgeons of England on 3 December 1975, during a Course on Plastic Surgery in the Treatment of Injury, under the auspices of the Faculty of Accidents and Emergencies.

there were 3 cases of gas gangrene Whelan (1971) records that the error was repeated in the Vietnam conflict and concludes that an attendant documented complication rate of 25 per cent to 40 per cent for primary wound closure and colon suture is unacceptable In contrast the treatment of missile wounds in Vietnam by early debridement and delayed closure carried an infection rate of only 2 58 per cent (Johnson 1971) Sadly those who treat casualties of today s road traffic accidents and terrorist activities too frequently ignore the lessons of history (fig 1)

Fig 1 *Gas gangrene [illegible] compound fracture treated [illegible] and [illegible] fixation [illegible]*

Missile Wounds

The nature of a missile wound is determined by its mass shape and velocity together with its behaviour during flight and within the body (fig 2) These effects have been summarised by Hopkinson and Marshall (1967) Low velocity missiles are considered to be those travelling at less than 2 000 feet per second and cause damage usually confined to the local area of impact whereas high velocity missiles which may now travel at over 3 000 feet per second inflict damage far beyond the local area A projectile is said to yaw when its longitudinal axis deviates from the line of flight If the bullet is spinning after being fired from a rifle for instance the yaw is converted to a spiral movement known as precession or to rotational movement in a small rosette pattern Velocity is of course all important since the kinetic energy of the missile is imparted to the tissues on penetration Tissue particles move away in all directions from its track to create a temporary cavity with a diameter many times greater than the size of the missile pushing aside vessels stretching nerves sometimes with axon disruption and fracturing bones (fig 3) The temporary cavity creates a vacuum drawing air and debris into the wound pulsates to disseminate contaminated material far and wide and within milliseconds contracts down to a permanent track

Ziperman (1961) demonstrated this effect by firing a missile with a velocity of 2 800 feet per second through a block of gelatin with different coloured powdered dyes at each end Red dye was carried in from the entrance wound on impact and blue dye was sucked in from the exit wound

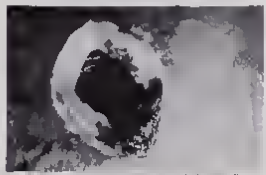


Fig 2 *High [illegible] Burnett [illegible] (Surgeon Lieutenant Commander Newcastle [illegible])*

Fig 3 *Missile track [illegible]*

as a result of the vacuum created by the temporary cavity The effect of a high velocity missile is therefore a grossly contaminated wound with a zone of tissue destruction far greater than the size of the final missile track High density tissues like muscle are extensively destroyed while low density tissues such as lung sustain less damage Using histochemical staining techniques Lt Colonel Scott (1975) and his colleagues at CDE Porton have demonstrated extensive disturbance of liver function distant to the track of a high velocity missile implying a need for more radical surgery In addition there are the effects of secondary missiles such as wadding clothing or street and vehicle debris and bone fragments (fig 4) while home made bombs and grenades of low or high velocity may cause multiple bizarre injuries

Fig 4 [illegible] b [illegible] fragment [illegible]

Debridement

It will therefore be evident that missile wounds require the most extensive debridement with the removal of all non viable tissue through incisions of sufficient length to permit the fullest exploration of the depths of the wound The deep fascia is similarly divided with transverse incisions at each end to prevent adhesion and subsequent subfascial tissue tension All fascial compartments are opened up and retained debris removed This is particularly important in wounds of the foot and hand where gross oedema may demand incision of palmar and plantar fascia Necrotic tissue especially all muscle of doubtful viability is excised (fig 5) and the wound is irrigated with saline and hydrogen peroxide Meticulous haemostasis is secured and injured blood vessels repaired or resected with the gap bridged by vein grafts (fig 6) and covered with muscle any

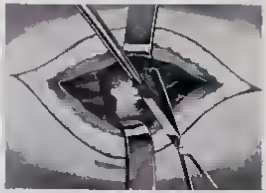


Fig 5 Muscle [illegible] at

doubt about vascular patency at other levels being determined by exploration with a Fogarty catheter or even by angiography Nerves are identified and marked

No attempt should be made to close missile wounds of the limbs Partial suture has been known to cause a constriction ring with distal necrosis After exploration of wounds of the abdomen and thorax, peritoneum and pleura should be closed

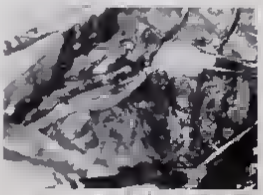
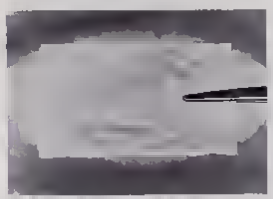


Fig 6 [illegible] Mr H H [illegible] Consultant Vascular Surgeon RN

and superficial layers laid open to be closed later by delayed suture Large defects in the abdominal wall may be closed by nylon mesh or by a large saline pack Granulations form over the intestinal coils and may later be covered by skin graft (NATO Handbook 1975) In head injuries only dura is closed primarily If joints are involved only capsule is sutured A layer of gauze is applied to the debrided wound covered in turn by a loose gauze pad and wool (fig 7) The wound must not be packed Limbs are immobilised and elevated unless vascular surgery has been carried out when they are kept horizontal at room temperature Plasters are bivalved and fractures of long bones stabilised only if absolutely necessary by external fixation techniques



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Wound Healing

Subsequent progress depends upon a number of factors which affect the healing process the nature of the terrain on which the wound was sustained, the missile ballistics the time lag between wounding and primary debridement the size and location of the wound the integrity of its vascular and nervous elements the quality of the primary surgery the nature and virulence of contaminating organisms and the haemoglobin status of the patient

Provided that initial debridement has been adequate, the open missile wound continues to ooze blood and serum for two days The wound is sealed by coagulated serum on the third day and early granulations appear over the surface of the fibrinous coagulum between the third and fifth days Between the fourth and sixth days ingrowing fibroblasts lay down collagen which increases in amount until about the fifteenth day (Brooks 1973) Epithelialisation begins at about the ninth day

Optimal Time for Wound Closure

The timing of delayed wound closure is therefore of the utmost importance for mobilisation of flaps becomes increasingly difficult from the seventh day onwards after which the wound must be re excised often with undermining of the flaps before closure without tension can be achieved Studies have therefore been undertaken to determine the optimal time for delayed wound closure

Lowry & Curtis (1950) reviewed 721 wounds in 360 consecutive unselected battle casualties of World War II and found that 97 per cent of wounds closed on the 4th or 5th day healed by first intention while wounds closed earlier or later fared worse (fig 8) Edlich Rogers Kaspar *et al* (1969) using guinea pigs compared the gross infection rate in contaminated open wounds with uncontaminated controls and found the ideal time for closure to be between the fourth and sixth days (fig 9) Shepard (1971) from his experiences of 442 battle and 85 civilian injuries treated by delayed closure concluded that wound healing occurred in fewer days than in wounds sutured primarily He therefore compared the bursting strength of wounds in rats treated by delayed closure with wounds closed primarily in controls and found that wounds closed up to the 6th day after wounding had significantly higher bursting strengths over controls (fig 10) Matsumoto Wyte Moseley *et al* (1969)

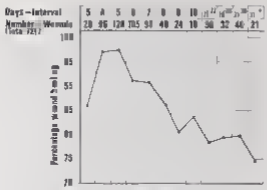


Fig 8 *Relationship between wound healing and delayed wound closure (Lipton and Curtis 1968)*

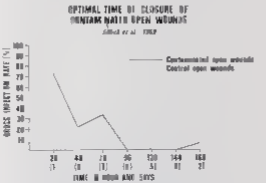


Fig 9 *Comparison of gross infection rate in contaminated open wounds with uncontaminated control wounds (Elliot 1969)*

attempted to correlate serum creatine phosphokinase (CPK) values prior to delayed closure with subsequent wound healing in 42 patients evacuated from Vietnam When CPK values were within the normal range (below 21 Sigma units) delayed closure was successful but if preoperative CPK values were elevated, delayed closure was complicated by infection Robson & Heggers (1970) attempted more precise prediction of the results of delayed wound closure based upon the number of viable bacteria per gram of tissue taken for biopsy from the wall of the wound They concluded that it was safe to undertake closure when there were 10^5 bacteria or fewer per gram of tissue They applied this principle to 95 military casualties treated by delayed wound closure

Wound strengths after closure

Days After Closure		Bursting Strength	
Control	Experimental	Immediate Closure (Control)	3rd Day Closure
3	3	73 0	228 0
8	6	220 4	328 0
9	9	338 5	440 0
			4th day closure
4	3	92 4	280 0
7	6	287 0	372 9
10	9	382 6	435 2
			5th day closure
5	3	184 8	249 8
8	6	273 8	334 5
11	9	383 3	424 2
			8th day closure
8	3	212 0	241 4
8	8	347 3	344 9
12	9	440 4	405 4

Fig 10 *Bursting strength of wounds in a fixed or variable interval after wounding (Shepard 1971)*

and achieved a 96 per cent successful closure rate Lipton Estruf Kamath *et al* (1974) argued that since the level of bacterial invasion influenced local metabolic activity and its products pH determinations of the open wound should reflect the bacterial count They proceeded to show that there were no pH readings of 7 2 or less in non infected wounds and suggested pH 7 2 as the lower level for successful wound closure (fig 11) However in spite of such attempts to determine scientifically the optimal time for wound closure it is salutary to remember that in World War II at least 25 000 soft tissue wounds were closed during the Italian Campaign alone on the basis of their gross appearance on or after the fourth day following initial debridement and that healing occurred in 95 per cent without loss of life or limb and without serious complications (Churchill 1944) All open wounds are contaminated and it is better to depend upon clinical judgment than to allow the optimal time for closure to pass

while awaiting the results of laboratory cultures although it is prudent to take a swab of the wound at the operation for closure

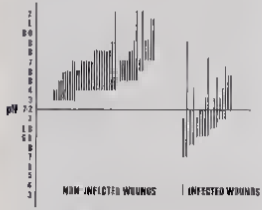


Fig. 11 *Relationship between wound pH and wound infection rate (Lipton 1974)*

Factors Delaying Wound Closure

A number of factors may delay wound closure beyond the optimal time infection may result from delay in treatment inadequate primary surgery circulatory insufficiency and anaemia resulting from initial blood loss Crush injury may demand extensive fasciotomies to evacuate subfascial collections and allow oedema to settle There are also effects of the ambient temperature In the tropics Wheatley (1967) found that oedema prevented adequate mobilisation of skin flaps and that the optimal time for closure was the tenth day while Butson (1975) has concluded from recent studies on wounds in subfreezing temperatures that earlier closure is necessary to avoid tissue necrosis resulting from freezing of moist open wounds (Kivisaari & Niinikoski 1975) There is some evidence that hyperbaric oxygen therapy may be of value for tissues devitalised in this way

The longer the wound remains open the greater the thickness of the surface coagulum which is considered by Rodeheaver Marsh Edgerton & Edlich (1975) to protect bacteria from antibiotics They therefore recommend enzymatic debridement in conjunction with appropriate antibiotic therapy in secondarily infected wounds

Technique of Wound Closure

Prior to operation for delayed wound closure anaemia is corrected and X rays are taken to exclude retained foreign bodies Dressings are removed under anaesthesia Swabs are taken for culture and wounds and skin thoroughly cleansed with 3 per cent hexachlorophane 4 per cent chlorhexidine or 10 per cent povidone iodine solutions The wound is carefully inspected and if necessary redebrided At this stage a temporary arterial prosthesis may need replacing by saphenous vein graft and fractures stabilised The primary surgical consideration is to avoid closure under tension and the aim should be to achieve careful coaptation of the wound edges without depending upon sutures to hold them together Deep sutures should be avoided Debrided wounds gape but if there has been no significant loss of skin and subcutaneous tissue and the wound is closed 4 or 5 days after debridement this can be achieved by freshening the wound edges with a scalpel and undercutting the flaps particularly if the wound is in the buttock thigh abdomen or chest Excision of the wound is usually required if 6 days or more have elapsed

However wounds are rarely ideally placed and after mobilising the flaps it will be found helpful to hold them lightly with tissue forceps in order to find the most satisfactory arrangement for their apposition without tension This may involve relieving incisions or one or more of a number of plastic procedures including local flaps and z plasties Fisher (1953) who reviewed 1 020 consecutive wounds treated in his unit during the Korean conflict laid down certain criteria undermining can

safely be carried out to a distance of 12 to 14 cms beneath each flap except for horizontally placed wounds of the thigh when undermining should be restricted to 5 or 6 cms Leg wounds of 8 cms or over normally require skin grafting It may only be possible to close one of two or more adjacent wounds the others will require skin grafting Relaxing incisions must not be made longer than 2 to 3 times the width of the intervening skin if the blood supply is to be preserved This is particularly important when skin and muscle are being sought to cover a vein graft bridging an arterial defect. It is only fair to say that not all surgeons agree that there is a place for undermining skin flaps particularly those with recent war experience

Wounds are closed by interrupted non absorbable sutures which should be left *in situ* for 14 days after vascular repair and whenever reasonable doubt exists about the quality of the blood supply In the two Korean series treated by delayed closure in Fisher s unit at Kure simple closure was possible in 80 per cent of his Series B but in only 54 per cent of his Series A which included more serious cases operated upon by a less experienced surgeon (fig 12)

Wounds which cannot be closed without tension must be covered with split thickness grafts Since the oedema will have settled It may be safe at this stage to close part of the wound by suturing and to graft the remainder Open split thickness skin grafting is the method of choice for war wounds since good quality skin is readily available and the cosmetic result preferable to that from mesh grafting (Pollock & Parkes 1969) which in any case cannot be used over joints Nevertheless there are occasions when the use of mesh grafts which were used extensively by the Americans in the recent Vietnam conflict are invaluable They include multiple wounds in association with burns when skin is in short supply and short

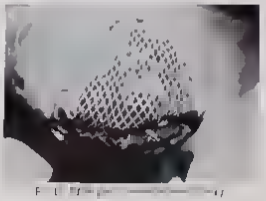
KOREA — TYPES OF CLOSURES *(Fisher)*

	Series A		Series B	
	No.	Per cent	No.	Per cent
Straight closure	149	54	536	80
Split graft	60	21	101	14
Graft and closure	38	13	31	4
Local flap	31	11	12	1.8
Distant flap	2	1	1	.5
Total	279	100	741	100

Fig 12 *Types of wound closure in two series during Korean Campaign (Fisher 1953)*

amputation stumps where no skin is available for flaps (fig 13) After passing through the Tanner Mesh Dermatome the meshed graft will cover three times the surface area of the unmesbed graft and has the further advantage in battle casualties that it allows contouring of the part with free drainage through the interstices Baksic Wilber Willett & Neviaser (1970) reported a take of 76 per cent to 100 per cent in 88 Vietnam casualties and Salisbury (1971) reported a minimum take of 85 per cent in 130 Vietnam cases He found the grafts well tolerated in pressure areas

Wounds of the scalp may require local plastic procedures and those of the abdomen the use of a local flap or skin grafting of granulations covering bowel or nylon mesh Good quality skin must be provided to surround a colostomy or ileostomy orifice Closure of chest wounds



usually presents little difficulty but intrathoracic drainage may have to be prolonged. Too early removal of pleural drainage tubes has often resulted in empyaema.

Antibiotics

It will be apparent that little has been said about antibiotics for they are no substitute for thorough surgical debridement and meticulous technique in delayed wound closure. They certainly have a prophylactic function but their chief role lies in the treatment of the complications. In fact Cleveland and Grove (1945) reporting a series of 2,393 delayed closures over compound fractures sustained during the Normandy landings, found the largest number of partial or complete failures was in patients who had received indiscriminate chemotherapy.

Acknowledgements

I have received considerable help in tracing references from Mr A. Sherwood, Librarian at the Institute of Naval Medicine and from Mr C. T. Parsons, Librarian at the Royal Naval Hospital, Haslar. My thanks are also due to the Technical Illustration Department, Institute of Naval Medicine and Mr J. Richards for illustrations and to Surgeon Lieutenant Commander R. Jolly and the Department of Photography, Royal Naval Physiological Laboratory for photographs.

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BOOK REVIEWS

MODERN TOPICS IN GASTROINTESTINAL ENDOSCOPY by Schlim and Paul Salmon. Pp 342. London, William Heinemann Medical Books. £11·50

The high incidence of gastrointestinal disease in the Royal Navy manifests itself with a majority of dyspeptic illnesses. The investigations made in recent years by the development of fibreoptic endoscopy has been of great significance to the diagnosis and management of patients in the Service. The publication of Modern Topics in Gastrointestinal Endoscopy in the future must welcome and this book remains in rapidly growing field in which there are as yet few publications.

Klaus Schlim and Paul Salmon both very experienced gastroenterologists and endoscopists, have gathered together a notable international array of authors which includes Professor Harold Hopkins who devised the principle of fibreoptics. They have produced an up to date account of the present state of fibreoptic endoscopy of the gastrointestinal tract which embodies primarily clinical aspects and diagnostic explanation. There also indeed the considerable therapeutic potential of these new techniques already well established with colonoscopic polypectomy.

There are valuable chapters on techniques, care of the patient, examination of gastric ulcer, therapy, haematemesis and melaena, rectal cancer and the operated stomach. In addition instrumentation and hazards are discussed and there are interesting contributions by a pathologist and two radiologists. Endoscopic retrograde pancreatography, enteroscopy, colonoscopy and polypectomy, and liver biopsy are all extensively covered and this book has two interesting chapters on the future of endoscopy and possibilities for research. The book ends with a final comment by the authors and there is a helpful glossary for newcomers to these specialised techniques.

The book is well produced and although one would prefer the histopathological illustrations to be in colour, it must be admitted that they are not in a book of this price.

This book is a valuable addition to the medical literature and should be read by all those now involved in using the new diagnostic techniques. Indeed much of the book would be usefully read by those physicians, surgeons and oncologists who refer cases for investigation and histopathologists who interpret the biopsies obtained.

RHH

PRACTICE — A Handbook of Primary Medical Care. Edited by John Cormonde, Marshall Marinker and David Morrell. Pp 156. London, Kluwer Harrap Handbooks. £6·50

This is the first instalment of a loose leaf book written specifically for general practitioners and as such it fulfils a long felt need. The contributors are all general practitioners many of whose names are well known to members of the College. Consequently the style and format may well be foreign to those accustomed to the more traditional type of text book. The scene is immediately set in the first chapter when an attempt is made to define health and ill health as an introduction to the discussion of the diagnostic process. From there we are led through the principles of treatment, finally to the complaint which is presented in a general form then a detailed manner under such headings as cough, headache and chest pain.

The book is easy to read and can be assimilated in the course of an evening. Certain sections are built with in the idealism somewhat unrealistic manner to which one has become accustomed when reading College literature but on the whole a pragmatic approach is preserved. The patronising style of certain contributors however may be irritating to the experienced general practitioner who does not require to have long established principles re-emphasised but provided that one is prepared to tolerate this the book is well written and certainly highly recommended to the MRCGP candidate who needs to be aware of current thought. Certain chapters such as David Morrell's on the use and abuse of drugs are indeed quite outstanding and will certainly encourage conscience searching.

The basic work of some 750 pages is being published in 5 instalments at a cost of £6·50 each plus £1·60 for a special binder. The updating service is planned to cost £6·00 per annum and the Editors anticipate that there will be a requirement for two supplementary issues. Undoubtedly for what it is an expensive book for the individual but I would go as far as suggesting that an library in a working practice will be complete without it.

JWB

Replacing the shot-out joint

L. G. P. Shiers

ABSTRACT

Over the last several years the [illegible] in the Near and Far East and the hinge [illegible] shaft has brought a new type of [illegible] joint. In this [illegible] the entire articulation of the knee or elbow is blanked away leaving sufficient bone for artificial [illegible] and amputation as the apparent treatment.

The two cases about to be described offer an alternative using a hinge devised by the author originally for the treatment of severe rheumatoid arthritis.

Anatomy of the Hinge

The hinge (fig 1) consists of two tri flanged stems each bearing half a hinge which are joined together by a main bearing. The bearing is prevented from drifting out by tapping down a few of the lugs over its ends and the whole prosthesis from rotating by its tri flanged stems which are cemented into the narrow cavity of the femur above or the tibia below. In the case of the elbow or the knee of a child a similar but smaller hinge is inserted into the narrow cavities of the humerus above and the ulna below.

There is no need for a different left or right hinge and no special instruments are required for the insertion.

Anatomy of the Knee Joint

Structurally this is a poorly designed joint consisting of the broad knuckle of the femur resting on the shallow hollows of the tibial plateau. Designed originally for walking on all fours it has adapted over tens of thousands of years to support man in the upright position. This is achieved by the development of powerful ligaments within

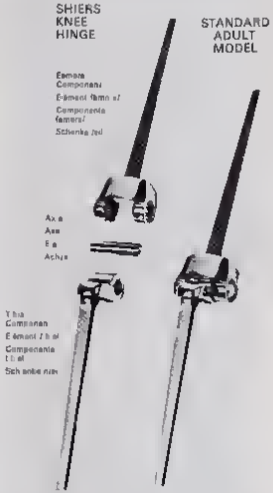


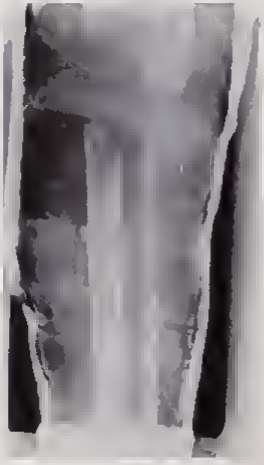
Fig 1

the joint and massive muscles investing it The combination is such that the human knee has both the power to drive a heavy ball from the half way line to conversion and the strength to withstand the shock of a ski jump Take away these ligaments and the knee is flail weaken the muscle and the knee is powerless destroy the bone ends and you have no knee

Case History (Knee)

A young army officer had his left knee blown away by a mortar shell He arrived in London with the leg in a Thomas splint — a clove hitch around the ankle to the end of the splint keeping the shattered bone ends apart The X-ray (fig 2) shows the gap between what was the lower end of the femur and what were the upper ends of the tibia and fibula Some shell fragments can be seen in the wound The lateral popliteal nerve had lost two inches giving him a foot drop but the popliteal vessels were intact

At operation I found the bone ends covered with a cartilaginous type of membrane extending down into the marrow cavities Once this was cleared a hinge was inserted in the usual manner after reaming the marrow cavities and filling them with cement (surgical simplex) The X ray (fig 3) shows the post operative result With a toe raising spring he was fully weight-bearing within three weeks of operation



FIG

FIG 3

Case History (Elbow)

This soldier's left elbow was destroyed by a nearby bomb burst. He came to London some months afterwards with an elbow fixed at almost a right angle but with no major nerve involvement. The X ray (fig 4) shows a fracture of the lower end of the humerus still united, the joint destroyed and multiple bomb fragments. At operation the ulnar nerve was transplanted and after excising the bone ends and, in this case, the head of the radius, I was able to insert the hinge as in fig 5. He obtained an excellent range of movement and was passed fit for full active service by his army medical board.

Fig. 4

Fig. 5

Summary

Until recently the complete loss of a joint by accident or gunfire has resulted in amputation. It is hoped that this brief article may encourage orthopaedic surgeons to try this method suggested — amputation must always remain the very last resort.

Further Reading

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Surgical Correction of Jaw Deformity

G D Sharpe

ABSTRACT

Surgical correction of the protruding mandible to produce both a better dental [illegible] and a better appearance has been practised for many years and [illegible] has established [illegible] this [illegible] This is [illegible] as a preliminary [illegible] of [illegible] but rather [illegible] bring before [illegible] dental [illegible] some information on the [illegible] that [illegible] treated — but surgery is [illegible] and but this [illegible] for the patient to [illegible] and [illegible] off work

Introduction

Although the true symmetrical protrusion of the mandible is probably the commonest deformity presenting for correction both retrusion and asymmetry can be corrected by similar techniques often giving even more dramatic results Any deformity of the mandible can be accompanied and accentuated by a similar or opposite defect of the maxilla and careful cephalometric analysis is always necessary to determine which component is at fault There are also now well established techniques for correction of maxillary deformities but these deformities are considerably rarer than those of the mandible and this paper will deal only with the latter

The majority of patients seek treatment because of their appearance but in most cases the dental arch relationship will be less than satisfactory It is not unknown for there to be no point of contact at all between the upper and lower dental arches in some cases of severe disproportion Therefore the aim of the oral surgeon will be to improve the dental occlusion as much as the patient s appearance

The Protruding Mandible

As stated earlier this is the commonest type of case presenting for treatment In simple terms the chin sticks out more than the patient likes and from the dentist s point of view the lower teeth are too far in front of the uppers This is the orthodontist s Angle s Class III relationship In the moderate case the teeth most affected by a poor or non existent relationship are the incisors making any biting with these teeth difficult or impossible Usually the back teeth have some contacts even if they are far from ideal and the patient has developed some sort of masticatory pattern (figs 1 and 2)

Before any surgery is undertaken it is necessary to make a careful examination of cephalometric radiographs plaster models of the teeth and profile photographs The photographs can be cut at various levels and the parts re-assembled to give some indication of the likely post operative soft tissue appearance The plaster models are mounted in the desired new occlusion and at this stage it will be evident where spot grinding or even extraction of teeth is necessary to achieve the optimum relationship After spot grinding new plaster models are required for the actual construction of cast silver cap splints Cap

Fig 1

Fig 2

Case 1 Angle's Class III dentition

splints are favoured by the majority of surgeons in this country but any acceptable method of intermaxillary fixation can be used and in America for instance arch bars and wiring are more commonly used Cap splints have the considerable advantage that most of the work on them is done by the technician in the laboratory before operation

The placement of 2 arch bars with all the wiring involved adds considerably to the operating time if done under the same general anaesthetic before commencement of surgery

Silver cap splints are also far easier for the patient to keep clean during the post operative fixation phase as there are fewer wires giving food trap areas than with arch bars in place

Surgery

A large number of different techniques have been used over the years and the majority involve the section of the mandible on both sides in the ascending ramus area and repositioning the central toothbearing arch fragment in its desired new position

A technique of body osteotomy had a certain vogue at one time whereby a section of bone was removed from the premolar region of the body of the mandible on each side This involved extraction of teeth unless they were already missing special provision for folding up the inferior dental nerve within the bone and usually packing of the site with cancellous bone taken from the iliac crest It has also been shown recently that this technique has a higher relapse rate than many others and because of all these disadvantages is very little practised these days

Operations in the ramus area have progressed a long way since the Kostecka procedure where a horizontal cut through the bone above the mandibular foramen was achieved blind with a Gigli saw passed through the cheek Apart from the operative disadvantages this method is theoretically undesirable in that very little bony contact between the cut ends results

Two particular techniques have found favour with the majority of oral surgeons in

[illegible] the sagittal split osteotomy and the sub sigmoid osteotomy

Both of these have advantages and disadvantages and the choice of which to use will depend on the particular patient and the degree of correction required

The Sagittal Split Osteotomy

In this procedure the ascending ramus on both sides is split in a sagittal plane taking care to avoid the inferior dental vessels and nerves A large area of bone to bone contact results and the central arch of the mandible can be moved backwards a considerable distance Rotation is also possible so that a degree of open bite can also be corrected at the same time If present The procedure is carried out intra orally so that no external scar is produced a major factor in any cosmetic operation (figs 3 and 4)

The disadvantages are the difficulty of the surgical procedure itself and the usual considerable post operative swelling that occurs This latter can be alarming to the patient who is not prepared for it and it is sensible to explain very carefully beforehand that swelling is quite normal following an operation on the jaw

The Sub-Sigmoid Osteotomy

The ascending ramus is sectioned this time in a vertical direction from the base of the sigmoid notch downwards and slightly backwards avoiding the mandibular foramen on the medial side to a point in the region of the angle The central arch is pushed backwards to the desired new position and the two condylar fragments are overlapped laterally on to the remaining surface of the ascending ramus The operation is carried out via a small external submandibular incision on each side a theoretical disadvantage However by careful positioning of the incision in or parallel to a neck crease the resultant scar becomes virtually unnoticeable in time

The degree of surgical difficulty and the post operative swelling are usually much less than with the sagittal split osteotomy (figs 5 6 7 and 8)

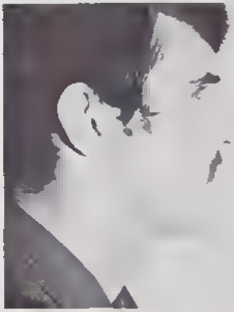

Fig 3

Fig 4

Case 1 Patient treated with sagittal split osteotomy

Fig 5

Fig 6

B f o

Fig 7

Fig 8

Co[illegible] lat[illegible] ucreat[illegible]d b[illegible] sul[illegible] [illegible] id ster[illegible] m[illegible]

Fig 9

Fig 10

Fig 11

Fig 12

Case 7 [illegible] bilateral [illegible] by sagittal split osteotomy

The Retruded Mandible

For this type of case the sagittal split osteotomy is the operation *par excellence*. The procedure is exactly the same as before except that the central arch of the jaw is merely slid forward rather than backward. Good bone-to bone contact is maintained and no additional bone grafting is necessary. Any operation involving section of the jaw transversely leaves a gap as the bone ends are distracted requiring the insertion of bone taken from either rib or iliac crest. Before the development of the sagittal split bone grafting was nearly always necessary to correct a retrusion (figs 9, 10, 11 and 12).

Fixation

This is maintained for a period of 4 to 6 weeks. 5 being a reasonable average. During this time the patient must survive on a fluidised diet and this is one of the important factors to be discussed between patient and surgeon when the operation is being considered.

Total time off work is usually 7 to 8 weeks from admission to final removal of fixation or rather this is what the patient should be prepared for. In fact in many cases the time works out rather less than this. Additionally once the immediate post operative swelling and discomfort have abated and the patient is in all other respects fit it is quite feasible for him or her to be engaged on light duties even though wearing the jaw fixation. In fact many prefer to be so occupied rather than sit at home idle. The important factor is that the suitable fluidised diet with sufficient calories should be readily available. At the other extreme there is the occasional patient whose home background may militate against discharge during the fixation period. In this case it is necessary to keep him in hospital over the whole period but this is fortunately rare.

Morale

Patients seeking this sort of treatment are usually strongly motivated towards achieving an improvement in appearance particularly. It is striking that most exhibit an apparent great uplift of morale even in the quite early post operative phase when there is still a degree of unsightly swelling present.

Conclusion

It is hoped that this short presentation will bring to the notice of medical and dental officers that patients presenting with unsightly and poorly functioning jaw relationships can be helped towards a better facial appearance and dental function, and that facilities for this type of surgery are now well established within the Service.

Water Soluble Myelography

J R Fullerton and J S Soutar

ABSTRACT

The technique of radicular myelography using a water soluble contrast medium is described and its advantages are reviewed

Introduction

Although an oily contrast medium (Myodil or Pantopaque) is still widely used in the English speaking countries a water soluble contrast medium (Ambrodil) was introduced to Sweden by Lidström and Arnell as long ago as 1930 This medium had the advantage of being miscible with cerebrospinal fluid and thus showed the thecal contents in greater detail than the oily contrast media Unfortunately Ambrodil was very irritant and its use had therefore to be preceded by spinal anaesthesia and was sometimes accompanied by alarming reactions

Recently a new compound Meglumine iocarmate* has been developed for use in spinal examinations Neurotoxicity is greatly reduced and spinal anaesthesia is not required but current experience suggests that the cord itself should not be exposed to the contrast medium and the principal application is in lumbo sacral radiculography i e below the level of the conus In this region the nerve roots are clearly seen through the aqueous medium (fig 1) and the signs of disc protrusion are considerably more subtle (fig 2) than in oil myelography This allows diagnosis to be made at an earlier stage

Fig. 1 The oblique view showing the nerve roots ▶

* *Dutter X (May and Baker)*

Fifty lumbo sacral radiculograms were carried out in the Royal Naval Hospital Plymouth during the ten months following May 1975 using Meglumine locarmate All the patients were suffering from low back pain and in a large number of cases the pain showed a sciatic distribution

Technique

The technique described by Grainger (1975) was used with several minor modifications

Lumbar puncture was performed by the radiologist with the patient sitting upright A fine gauge (20 or 21 SWG) disposable spinal needle was used in order to minimise any subsequent escape of CSF and 1 per cent Xylocaine plain was used as a local anaesthetic

After two samples of 2ccs of CSF were obtained for laboratory analysis a further 2ccs was withdrawn and mixed with 5ccs of Meglumine locarmate The resulting mixture was then slowly injected into the subarachnoid space

The patient experiences no pain or discomfort during the injection

The spinal needle was now removed and the patient was placed prone on a tilting fluoroscopy table and a series of films were taken with 10° foot down tilt and then repeated at 30° At each angulation AP and oblique views (fig 3) using the under couch tube and then horizontal ray laterals (fig 4) using the over couch tube were obtained

After completion of the examination the patient was returned to the ward either in a chair or by assisted walking and he was then maintained sitting upright for eight hours He does not lie completely flat for a further six hours (i e he may be supine with the head of the bed raised 20°)

Reactions

A number of adverse reactions have been described in the literature including headache low back pain nausea and vomiting hypertension and painful spasms In our series of 50 we have not encountered any examples of serious reactions Eight patients complained of low backache and two experienced headache following the procedure It seems very likely that these symptoms were the result of the lumbar puncture and in fact an incidence of headache in only 4 per cent of cases is a lower percentage than would be anticipated following a routine lumbar puncture Perhaps this low incidence of headaches is the result of the fluid replacement which occurs when the contrast medium is introduced

In one case contrast medium was inadvertently injected into the sub dural space but this merely emphasised one of the major advantages of the water soluble technique in that the procedure was repeated successfully with a clear field three weeks later

It is worth mentioning that when laminectomy has been carried out shortly after water soluble myelography the tissues have appeared oedematous and in particular the fat in the spinal canal has been wet (Telfer 1976) We believe that this finding is due to the patient s erect position after the examination which results in the increased hydro static pressure in the lower theca and a leak through the puncture in the dura

The occurrence of Adhesive Arachnoiditis after lumber myelography is well documented Contrast media injected into the lumber subarachnoid space can cause either histologically visible reactions or clinically demonstrable irritation of nerve roots Most if not all media used for myelography cause these reactions but they occur much less frequently with Meglumine locarmate One of the contributory factors in the development of Adhesive Arachnoiditis is believed to be the hyperosmolarity of contrast solutions in comparison with the CSF Meglumine locarmate has a low osmolarity but a recent

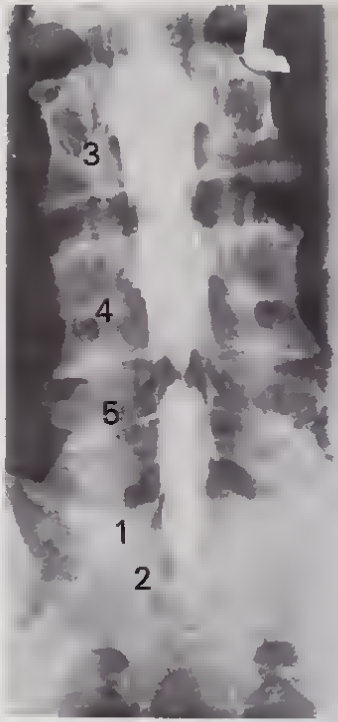

Fig. [illegible] [illegible]


4
5
1
2
5
1
2

[illegible]

[illegible]

contrast medium (May & Baker 1976) from the makers of the contrast medium suggests that this can be reduced still further if the medium is mixed with 2cc of sterile water instead of a similar quantity of CSF and we have now adopted this modification to our technique

Discussion

We have no doubt that a water soluble contrast medium is preferable for lumbar radiculography Water soluble contrast media are readily miscible with CSF and thus allow the nerve roots and their sheaths and sleeves to be shown They are rapidly reabsorbed allowing unimpeded repeat examinations and an early return to normal of iodine metabolism (Thyroid Function Tests)

In comparison the oily contrast medium (Myodil) does not satisfactorily display the nerve roots and their sheaths and is retained indefinitely in the subarachnoid space and meninges In addition the retained iodine affects protein bound iodine tests for many years (White 1972) and it may also play a part in the development of Arachnoiditis

Sixteen of our cases have come to surgery and in all instances the diagnosis made on the radiculogram has been confirmed

We have found that [illegible] soluble [illegible] Myodil [illegible] locarmate [illegible] safe [illegible] method and one which produces an accurate answer in a high proportion of cases Consequently we believe that when seeking to confirm a disc protrusion in the lumbo sacral region this method should now be preferred to oil myelography

Acknowledgements

We extend our thanks to the Staff of the X Ray Department Royal Naval Hospital Plymouth for the excellent quality of the radiculograms and to the Medical Officer in Charge Royal Naval Hospital Plymouth for permission to publish

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BOOK REVIEW

A HANDBOOK OF RADIOGRAPHY 4th edition John A Ross & R. W Galloway Pp 290 Illustrations 113 London H K Lewis & Co Ltd £7 00

First published in 1940 this book was written to cover parts of the syllabus of the Diploma of the Society of Radiographers for diagnostic radiography In the new edition the authors have also sought to provide information for trainee radiologists

The book has been extensively revised and although the format is similar to previous editions much more use has been made of sub sections and sub headings Facts figures and units of measurement have been updated and there is an added appendix With one exception all illustrations are line diagrams most of which are simple clear and uncluttered The contents include three chapters which deal with physics radiation protection and radiographic photography eleven chapters on radiological procedures and radiographic techniques and one chapter pertaining to hospital practice and care of the patient

This radiographic compendium contains much useful information and a number of practical tips but because the book includes so much in so wide a range of topics it might have been helpful if further reading references had been quoted

The chapters on protection and of special procedures special techniques and hospital practice are particularly informative The book would have gained that much more if lighting had not been specified in five precise technical details of radiographic techniques instead of the chapters on physics and photography

Although parts of the book may be suitable for the SR(R) level it is full of technical terms and is more suited to qualified staff i e HDS(R) and above

The third edition published 1963 sold 11 121 copies Since then not only has inflation had its effect but other authors have produced similar manuals at less cost Perhaps the publishers could give some thought to producing a paper back version

ANMcN

Is Myringoplasty Worth While?

P D Jackson

ABSTRACT

This paper analyses [illegible] myringoplasties carried out at the Royal Naval [illegible] Hospital Haslar [illegible]

Introduction

Myringoplasty is the repair of a defect in the tympanic membrane Although in order to cover the defect foreign material such as cigarette paper or gelfilm (Lange 1970) have been used generally autograft connective tissue is now used and of such tissue readily available temporalis fascia has been shown to give the best success rate in various series (Smyth and Kerr 1969 Booth 1972) A perforation of the tympanic membrane may give no trouble to the patient for prolonged periods or indefinitely but its closure reduces the possibility of infection of the middle ear With the conversion of the middle ear cavity into a blind *cul de-sac* there can be no free flow of air and with it infected mucus from the naso pharynx via the Eustachian tube through the ear and water contaminated either by organisms or toxic chemicals (e g chlorine from swimming pools) cannot gain access to the middle ear via the external auditory canal

There has therefore been an aggressive policy in the Royal Navy to close perforations even if this has meant repeated operations for the patient Repair may also result in a hearing improvement and where there is ossicular discontinuity this may be restored at the same time or subsequently The operation is without [illegible] to the patient [illegible] there is but little discomfort [illegible] the hospital within [illegible] On the other hand it is not [illegible] but one which requires [illegible] the surgeon and by the patient (success is more likely with a dry field in a hypotensed patient) and there is by no means a 100 per cent success rate Indeed some Otologists are so dissatisfied with their results that the justification for attempting to repair the tympanic membrane is now privately questioned

Techniques

The problem peculiar to myringoplasty is that the tympanic membrane separates atmospheric air from an underlying air filled space the graft closing the perforation cannot be laid on a well vascularised bed as for example a skin graft to a burn but at least where it replaces the membrane is suspended as it were in mid space It relies for its blood supply on vessels growing in from the edges and not from underneath Generally a previously healthy tympanic membrane which has been perforated either from infection or from trauma will heal spontaneously and it is probable that the failure of a perforation to heal is due principally to poor blood supply Other adverse factors include infection elsewhere in the upper respiratory tract and

Eustachian tube dysfunction

The methods most commonly used of placing the graft are depicted in the diagrams

Onlay and onlay flap (fig 1)

The external layer of squamous epithelium is stripped off the drum from around the perforation and the free graft applied In some cases limited local flaps of external canal skin may be dissected and applied on top of the graft to encourage vascularisation

Underlay (fig 2)

The outer layer of tympanic membrane is conserved and a bed provided for the graft by scratching the inner layer away in a limited region around the perforation the graft is applied through the perforation on the deep aspect of the tympanic membrane to which it is held by gelatine sponge placed in the middle ear cavity

Through (fig 3)

Here the annular ligament (a firm ring of fibrous tissue which surrounds the tympanic membrane giving support to it where the inner and outer layers leave the bone) often together with some adjacent outer canal skin is dissected over a limited section generally posteriorly and the graft is passed behind the ligament and through the perforation

Kerr (Kerr 1972)

This essentially is an *onlay* technique with the important features of

a good exposure of the whole of the tympanic membrane by burring away overhanging meatal wall particularly anteriorly

b the dissection of a vascular strip from the handle of the malleus in continuity with the adjacent skin from the superior meatal wall

c removal of a cuff of canal skin in continuity with the outer layer of [illegible] of the tympanic [illegible] preserving the vascular [illegible] Silastic sheeting is [illegible] the middle ear to prevent [illegible] The graft is laid in the [illegible] tympanic membrane and [illegible] drum remnant and on [illegible] may be placed medial or lateral to the malleus The graft extends on to the wall of the external canal The vascular strip is then replaced on top of the graft and more gel foam on to this

Discussion

The early operations were of the *onlay* type for years this was the standard technique in the Royal Navy it is quicker than other techniques and requires less dissection However in the author s hands the results of this technique have been disappointing The *Kerr* technique seems attractive because of the insistence on good exposure and the provision of a large area of meatal wall from which the graft could be vascularised Further this was eminently suitable for the large or sub total perforation which we saw so frequently and one could be thorough in excising areas of tympanic membrane rendered either stiff from tympanosclerosis (chalk) or diaphanous and of poor quality from scarring

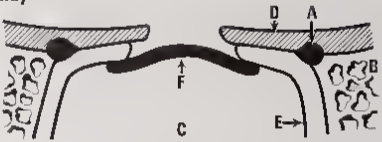
Hough (1970) a protagonist of the *underlay* repair criticises the laterally placed *onlay* graft mainly because of

a anterior blunting (fig 4) which compromises the hearing improvement

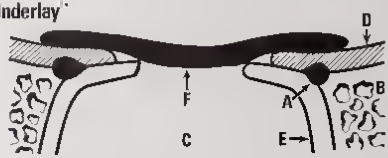
b lateral retraction of the graft which in extreme cases may be so removed from its proper site as to constitute canal atresia There are criticisms too of the underlay technique and it is interesting to find that the results of Kerr (1972) and Hough (1970) are similar

Examples of the success rates in various series are 82 per cent (Strauss 1975) and 95 per cent (Hough 1970) and in his review of

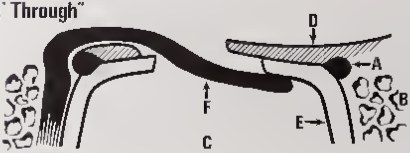
1. "Onlay"



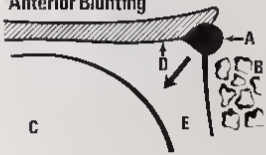
2. "Underlay"



3. "Through"



4. "Anterior Blunting"



A Annular Ligament
B Bone of meatal wall
C External Canal
D Internal Layer
E Outer Layer
F Graft

Table I

Results

YEAR	ONLAY						ONLAY-FLAP						UNDERLAY						UNDERLAY-THROUGH						KEHR						TOTAL FOR YEAR	TOTAL SUCCESS	TOTAL FAILURES	TOTAL RESULT UNKNOWN
	TOTAL	SUCCESSFUL	FAILURE	UNKNOWN	PRE AND POSTOP AUDIOGRAMS	AVERAGE GAIN IN HEARING dB	TOTAL	SUCCESSFUL	FAILURE	UNKNOWN	PRE AND POSTOP AUDIOGRAMS	AVERAGE GAIN IN HEARING dB	TOTAL	SUCCESSFUL	FAILURE	UNKNOWN	PRE AND POSTOP AUDIOGRAMS	AVERAGE GAIN IN HEARING dB	TOTAL	SUCCESSFUL	FAILURE	UNKNOWN	PRE AND POSTOP AUDIOGRAMS	AVERAGE GAIN IN HEARING dB	TOTAL	SUCCESSFUL	FAILURE	UNKNOWN	PRE AND POSTOP AUDIOGRAMS	AVERAGE GAIN IN HEARING dB				
1968	2	1	1																												2	1	1	0
1969	5	2	2	1	1	4	1	1																							6	3	2	1
1971	4	1	3		1	6													2		2										6	1	5	0
1972	7	2	5		4	5	4	3	1		3	11	1		1				1		1		1	7	1	1			1	24	14	6	8	0
1973	3	2		1	1	10	3	1		2	1	0	1		1		1	4							6	5	2	2	6	9	16	8	3	5
1974	4	3	1		4	14	6	4	2	2	6	6	1		1				1	1			1	6	7	6	1		7	2	21	14	5	2
1975	4	3	1		4	6	3	2	1		2	14													6	7	1		7	2	15	12	3	0
1976	1	1			1	16	3	1	1	1	2	2	4	3	1	0	2	6							14	6	3	2	11	16	22	14	5	3
TOTALS	30	15	13	2	16	6	22	12	5	5	14	4	7	3	4	0	3	3	4	1	3		2	9	36	26	7	4	32	6	102	59	32	11

the results of [illegible] Urmston surgeons Booth (1972) concluded that no graft position produced results conspicuously better than another for hearing (though he did not consider the Kerr technique in his series)

Results

The results are summarised in Table [illegible] Closure implies there was vascularisation with no perforation seen on review up to 12 months or until the patient was lost to follow up It is accepted that there may indeed be delayed perforation after this time but for the most part failures are due to the graft perishing before it becomes revascularised and are therefore detected early In determining the hearing level improvement the post-operative audiograms used are the best of those taken in the post operative period The intention here was to discover the effect on the hearing level of the operative interference and improvement is assessed on the difference between the hearing levels in pre and post operative audiograms (where these are available) irrespective of whether perforation was closed or not In many cases recorded as failures the residual defect has been much smaller than the original and there has been a marked improvement in the hearing Conversely in a few cases there has been a loss of hearing in patients whose perforations have been closed the average hearing level of a patient operated on in 1974 fell from 84dB to 96dB (with a subsequent middle ear reconstruction she has gained a useful hearing level) One patient after an initial take of the graft with closure of the perforation [illegible] marked improvement in the [illegible] record was found on review 8 months or so later to have a dead ear and a perforation (The hearing improvement recorded is the average in the change in hearing level at 250 500 1000 and 2000 Hz)

In this series the youngest patient was aged 9 and the eldest a lady of 62 (keen on swimming from the Hoe with her husband)

Summary

The chances of success at any one operation appear to be 70 per cent to 80 per cent and the success rate is higher in the later part of the series For the failures the chances of success at a second attempt are about 50 per cent to 60 per cent Some improvement in hearing can be expected this may be marked and in those cases where there is ossicular discontinuity this may be improved by a later ossicular plasty (it is hoped to present the results of such middle ear reconstruction in a further paper)

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PUBLICATION BY RN MEDICAL OFFICER — ABSTRACT

JACKSON P D (1976) Traumatic Ossicular Dislocation by Stapes Fixation *Journal of Laryngology and Otology* 90 707 709

This paper reports a 24 year old naval rating who as a result of a head injury sustained a dislocated malleo incudal joint with an ipsilateral sixth and a seventh nerve palsy Tympanotomy revealed that additionally there was a stapes fixation and with a middle ear reconstruction together with a stapedectomy long term follow up has shown an improvement of 35 dB (average) over the low frequencies

In Vitro Measurements of Thyroid Hormones

W. F. D. Sampson

ABSTRACT

Considerable [illegible]

Introduction

Requests for serum thyroid hormone estimations are steadily increasing and the proliferation of laboratory *in vitro* tests of thyroid function and their nomenclature has led to some confusion and possibly erroneous conclusions It is well worth remembering that investigations carried out even in the best laboratories produce values outside the normal range in 5 per cent of the euthyroid population In addition these tests are subject to factors unrelated to the thyroid gland imposing limitations on interpretation which are often not appreciated These are discussed fully in the appropriate sections dealing with a particular test

Methods and Materials

In this laboratory the two thyroid hormones liothyronine (T_3) and thyroxine (T_4) are assayed

Normally the serum T_4 value is approximately fifty times greater than that of T_3 and accounts for at least 90 per cent of the circulating protein bound iodine Most of the T_4 i e about 99 9 per cent is bound to protein principally thyroxine binding globulin It is the free [illegible] which is considered biologically [illegible]

The potency of T_3 is 3-4 times that of T_4 In the past low levels of T_3 were difficult to estimate in the presence of excess amounts of T_4 and it is only recently with the advent of radioimmunoassay that the role of liothyronine in maintaining the euthyroid state has been recognised Approximately 99 7 per cent of serum T_3 is bound to protein and in normal circulation FREE T_3 is about one seventh the concentration of FREE T_4

T_3 biological activity is independent of T_4 and it is at present speculative whether T_4 has intrinsic activity or merely acts as an inactive prohormone

Factors Influencing T_4 in the Normal Population

Conditions which increase protein binding capacity thus elevating the T_4 value are found in pregnancy and following the ingestion of oral contraceptives or other oestrogen preparations and in situations where congenital variations in thyroxine binding globulins occur e g nephrotic syndrome severe liver failure and androgen therapy Drugs such as diphenyl hydantoin salicylates and phenyl butazone also compete for binding sites on the T_4 carrying proteins resulting in decreased levels of Thyroxine Also large doses of penicillin and serum haemolysis affect measurement of these hormones

Factors Influencing T_3 in the Normal Population

Changes in serum T_3 levels are influenced by factors similar to those affecting serum T_4 i e increase in binding globulin capacity due to oestrogen therapy pregnancy etc In addition up to a 40 per cent drop in serum T_3 has been observed following cold surgery or in patients with illnesses unrelated to thyroid disease

Measurement of Thyroid Hormones

a *PBI measurements*

The estimation of protein bound iodine dominated laboratory thyroid measurement for over 20 years it had a high degree of reproducibility but its lack of specificity in measuring non hormonal forms of iodine contained in foods drugs and environmental contamination gave false results It has long been discontinued in this and most other laboratories

b *Resin uptake and competitive binding measurements*

T_3 radioactive resin uptake and T_4 competitive protein binding measurements have gradually replaced the PBI techniques and these were the techniques used by us until the advent of radioimmunoassay

Thyroxine(T_4) produced in the thyroid gland is carried by the blood predominantly as a complex with serum proteins In the T_3 test liothyronine labelled with radioactive iodine is mixed with a serum sample where it competes with the natural hormone already present for protein binding sites The capacity of the serum to bind the labelled T_3 is a reflection of the degree of prior saturation of the serum proteins with endogenous T_4 and is thus an indirect measure of the activity of the thyroid gland

c *Principle of T_4 competitive protein binding*

Thyroxine is extracted from a serum sample with ethanol and added to a test vial containing 125 — labelled L-thyroxine human TBG adsorbent granules and buffer Thyroxine from the sample competes with labelled thyroxine for a limited number of binding sites on the TBG The amount of radioactivity bound to TBG is inversely proportional to the amount of thyroxine in the serum sample

d *Additional factors affecting resin competitive binding and uptake tests*

To test the effect of travel on serum specimens we ran a brief serum transport trial sending pre measured sera abroad with instructions to return the samples immediately There were considerable changes in the T_3 and T_4 levels when reassayed Bacterial infected serum after one week in transit raised the T_4 result to three times its original measurement In addition we have demonstrated that deep freezing sera for 3 to 4 weeks resulted in raising the original measurement by one third This of course was not an increase in the hormone level but probably protein denaturation and contamination of the resin used in the test

e *Radioimmunoassay testing*

The introduction of the radio immunoassay kits for assaying serum T_3 and T_4 levels into routine use has now greatly improved thyroid hormone estimation Serial evaluations of these kits over the past few months have shown them to be reliable reproducible and specifically free from many of the external factors affecting the competitive binding and indirect measurement methods

Principle of T_3 and T_4 Radioimmunoassay

This method depends on competition for binding sites on a T_3 or T_4 specific antibody between serum hormones and ^{125}I-labelled hormone The proportion of ^{125}I labelled hormone bound to antibody is inversely related to the concentration of hormone present in serum This proportion is measured by separating the remaining free hormone by adsorption on to solid matrix and estimating the radioactivity of the bound fraction remaining in solution This measurement is then interpolated with

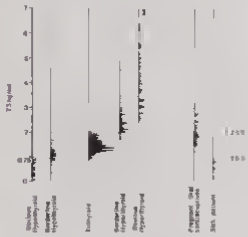
known concentrations of hormones and relative values estimated The only common factor affecting the accuracy of this test is a raised level of oestrogens (oral contraceptives pregnancy etc) in the blood

Units

Up until now the unit used to express T_3 levels was percentage protein binding e g a low per cent binding indicates an elevated T_3 hormone and *vice versa* With the RIA test now in use actual T_3 present is measured in ng/ml (conversion to SI units given by 1 ng/ml= 1 54 nmol/dm³)

Normal values for this laboratory are illustrated in fig 1

T3 RADIOIMMUNOASSAY



A typical group of 621 patients The T3 values in seven categories based on clinical diagnosis are illustrated

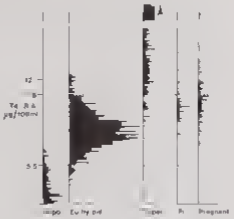
Fig 1

T_4 is measured as hormone present and expressed in micro/g/100ml (Conversion to SI units 1µg/100 ml=12 78 nmol T_4/1)

The conversion scale in fig 3 may be found useful

Normal values for this laboratory are illustrated in fig 2

T4 RADIOIMMUNOASSAY



95% confidence limits of combined normal ranges
For this laboratory 5·5 to 11·5 µg/100 ml

Fig 2

T_3 Suppression Testing

When a clinically toxic patient exhibits equivocal serum T_3 and T_4 values a T_3 suppression test is usually sufficient to confirm or deny the diagnosis Following the receipt of an equivocal result the patient is given 80 micro/g Liothyronine daily for 8 days prior to measuring the uptake of ^{131}I in the neck If the uptake of radio iodine is less

T4
SI UNITS

Thyroxine values quoted are in units of µg T4/100 ml Conversion to SI units of nmol T4/1 may be made using the following expression nmol T4/1 µg T4/100ml x 12 87

The conversion scale opposite may be found useful

Fig.3

than 50 per cent of the percentage uptake equivalent to the initial T_3 T_4 levels then the thyroid is fully suppressed and the patient euthyroid. If there is little or no diminution in uptake or hormone production the patient is toxic.

TSH Testing

In cases of myxoedema where there is some doubt as to whether this is a primary or secondary hypothyroidism the injection of 10-20 IU Thyrotropin 24 hours before estimation of serum T_3 T_4 levels will usually provide an answer. In the case of primary myxoedema there will be no response to the injection of TSH while in secondary hypothyroidism there will be an immediate rise in serum T_3 T_4 levels.

Conclusion

In view of the many external factors affecting the PBI, T_3 and T_4 resin and thyroid binding estimations these tests have been discontinued and the recently introduced T_3 T_4 radioimmunoassay technique is now employed in this laboratory. When requesting this test it should be emphasised that conditions affecting blood oestrogen levels (oral contraceptives, pregnancy etc) must be annotated on the appropriate request forms.

Acknowledgement

I would like to thank the Radiochemical Centre Amersham for helpful information and data.

BOOK REVIEWS

THE MEDICAL RISKS OF LIFE by Stephen Lock and Tony Smith. Middlesex: Pelican Books. 95p.

The authors' intention in this slim volume is to give an up-to-date account of the established facts and [illegible] from the research on the causes of illness, to describe the results of past changes in behaviour and to assess the effects of new social trends. Both authors are undoubtedly journalists of great experience, the Editor of the British Medical Journal and the Medical Correspondent for *The Times*.

The book will be read by those laymen who already take an intelligent interest in their own [illegible] preservation and by doctors who wish to see how [illegible] research and hypotheses may be presented for public enlightenment. The [illegible] the range [illegible] the Health [illegible] [illegible].

In the [illegible] there is an amusing [illegible] chapter — The [illegible] a motor [illegible] respiratory [illegible] Certainly [illegible] Far East [illegible] in this way.

The book [illegible] field and provides much interesting reading, particularly in the field of occupational medicine. It is a useful preliminary acquaintance for doctors wishing to have a short account of current achievements outside their own field. They may bewail the lack of a bibliography but this is not a feasible proposition in a book of this range. The potential purchaser should not be discouraged by the poor taste of the cover design.

SRV

MEDICINES: A GUIDE FOR EVERYBODY — Peter Parish. Pp [illegible] Harmondsworth: Penguin paperback £1.50. Allen Lane hardback £5.00.

Dr Parish, whose criticisms of doctors' prescribing habits are frequently reported in the popular press, has stated that the aim of his book is to provide information about drugs to people with no medical training or knowledge.

It is not disputed that he has succeeded in providing such information. The book is well written in layman's terms and the information which is presented in three parts (Part I discussing basic principles of drug use, Part II being a reference section on groups of drugs and Part III a comprehensive pharmacopoeia of individual drugs) is essentially correct and of a sufficient level to be of use to medical students and nurses.

What may be disputed is whether the book should have been written at all. No doubt many doctors will disapprove of such a book and Dr Parish acknowledges that he is unlikely to gain popularity with his colleagues. However, if the book results in better prescribing and a reduction in drug reactions through the education of the layman, its publication will have been justified.

THS

Central Body Rewarming for Hypothermia — Possibilities, Problems and Progress

William J. Guild

This short article reports on work being carried out on central body rewarming (CBRW) and portable CBRW equipment for the treatment of acute hypothermia in the field. The work was prompted by Lloyd (1972, 73) who described simple equipment for passing several litres of CO_2 rapidly into a Waters canister containing about 500 gm Durasorb soda lime to produce warm moist air at 50-60°C which was then inspired by the patient using a normal anaesthetic tube and mask either in open circuit or in closed circuit with oxygen. Some patients suffering from chronic or acute hypothermia have been treated in hospital by CBRW (Lloyd 1973) using warm moist air at 40-50°C from humidifiers to reduce respiratory heat loss and augment the reduced body heat production.

At the present time there is an increasing awareness of the significance of cold in outdoor occupations and recreations and the need for a better understanding of the causes and treatment of acute hypothermia has been emphasised by Keatinge (1969), Golden (1975), Hayward (1975) and others. However it must be remembered that most rescuers and first aiders who may have initial and sometimes prolonged charge of exposure casualties are not medically trained and most of the mountain cave and coastal rescue situations exclude all but basic on spot first aid aimed at reducing heat loss and promoting some degree of spontaneous rewarming, the currently recommended treatment by trunk immersion in hot water at 42-44°C is obviously seldom possible in the early stages of any outdoor rescue. Any new basic treatment in the field, however must be medically justified, safe and simple.

Although medical opinion is not unanimous the hot bath is considered by many to be the best treatment available for acute hypothermia and it has many successes to its credit. Freeman & Pugh (1969) and Burton & Edholm (1955) qualify this however, suggesting that there may be cardiac complications with deeply hypothermic patients including the risk of ventricular fibrillation either from a continuing afterdrop in body temperature or from extensive handling, while there is the added possibility of cardiac failure from the increasing work load on the heart caused by the intense vasodilatation.

Calculations by Lloyd *et al* (1972) based on formulae of Burton & Edholm (1955) suggest that a hypothermic patient with a body temperature of 30°C and estimated heat production of 30 Kcal/m²/hr (compared with 50 Kcal/m²/hr in a normothermic person) would have a respiratory heat loss of about 8-9 Kcal/m²/hr. Theoretically CBRW at approximately 50°C should turn this negative heat balance into a positive balance of about 9-11 Kcal/m²/hr, eliminating the respiratory heat loss of 8-9 Kcal/m²/hr and providing a small balance to augment heat

production

Nevertheless opinions differ on the possible value of CBRW treatment for acute hypothermia as much has still to be learned about the heat flow pathways in CBRW and the extent to which the cardiac pulmonary and hypothalamic regions may be heated and their functions stimulated but as the CO_2/soda lime technique for CBRW does produce heat and moisture and minimises respiratory heat loss further work on the basic physiology of CBRW to determine what advantages it has over other methods of emergency rewarming and whether it could supplament or replace them in particular situations would appear to be justified

Problems in Using the CO_2/Soda Lime Technique

Any further serious consideration of using the CO_2/soda lime technique for operational purposes requires careful study of the heat characteristics of both the technique and the equipment in Lloyd s original design

Temperatures inside a Waters canister can exceed 95°C with a large and rapid input of CO_2 and hot saturated air rather than simply warm moist air at well above 60°C can reach the face mask with consequent risk of burn or scald effects to the lips mouth and nasopharynx In tests with the original open circuit equipment in which there was no control of the initial heat surge or the temperature reached at the mask the writer twice sustained painful mouth burns There were only minimal data on the temperature gradients throughout the system and the heating and cooling rate of the equipment as a whole and no data on effective insulation Subsequent tests showed that at low ambient temperatures of 0 2°C after the characteristic initial heat surge in the canister the inspired cold air and condensation of water vapour inside the inspiration tube valve and mask rapidly reduced the heat level and limited the time that a potentially useful heat level (above body temperature) could be maintained to less than fifteen minutes

The figures of 50 60°C suggested by Lloyd *et al* (1972) and Moritz Henriques & McLean (1945) as being suitable for warm moist air inspiration are too high for the wet heat produced by the CO_2/soda lime method Tests with a number of subjects showed that above 47°C it became unpleasantly hot while above 50°C there were burning sensations Lloyd (1973) refers to some laryngeal oedema and tracheal scalding in an elderly patient following maximal humidifier treatment for acute hypothermia while Mackenzie (personal communication) found extensive tracheal scalding in pigs with hot wet air at 70+°C introduced by endotracheal tube Continuous breathing of moist or wet air at 50-60°C over a period of time by a semi conscious or unconscious casualty would undoubtedly involve risk A more acceptable safe and potentially useful range would appear to be below 47°C

Progress with the CO_2/soda lime technique

Numerous experiments have now been carried out with modifications of Lloyd s original equipment to try to overcome the heat surge problems and minimise the risk of high temperatures at the face mask and to lengthen the time that a useful heat level is maintained A larger mass of soda lime (1500 gm) and carefully controlled inputs of CO_2 from J tubes — 12 litres into the upper part of the container followed three minutes later by 24 litres into the lower part of the container — enable the initially cold equipment to be quickly warmed up and then warm moist air at 37 47°C to be delivered to the face mask for periods of up to 45 60 minutes both at outside room temperatures (20°C) and at low ambient temperatures (0 2°C) It has been found possible to control the initial heat surge at the face mask within the desired range of

37 47°C by using a small finger-operated nylon spring valve fitted in the cheek of the face mask This allows the rescuer to mix ambient air with the inspired hot moist air to maintain the mask temperature within the required limits marked on a linked telethermometer dial The heat of the expired air can also be used to warm up cold incoming air in a mixing space below the soda lime in the container and so prolong the effective heating period of the soda lime while effective insulation of the whole unit can be obtained with Armaflex insulation tubing and one inch foam rubber sheeting

A lightweight portable model incorporating these essential modifications of Lloyd s original equipment and technique is being assembled for testing under a range of temperature and wind chill conditions likely to be encountered in the field The unit must be simple to prepare and operate and easy and cheap to maintain and if it gives satisfactory results and if it appears that CBRW as a treatment for acute hypothermia out of doors is worth serious consideration a number of units will be assembled for evaluation under operational conditions on the coast and in the hills

It is hoped to present a full account of this work with relevant data in this Journal during 1977

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Surgeon Probationers: The young medical students who served in the Royal Navy during the First Great War of 1914-1918.

R S Allison

Part II

Chapter 3

Contribution of the Belfast Medical School

In the Queen's University Belfast an Officers Training Corps had been formed in 1911 12 its contingent forming part of the Territorial Army It played a big role in the training and formation of the Ulster Division which took such a prominent part in the Battle of the Somme in 1916 and which suffered such heavy casualties * But despite Belfast s Importance in naval architecture with Harland and Wolff and Workman Clark as universally known shipbuilders it had no naval counterpart like the Officers Training Corps in the university Even in 1924 when *HMS Caroline* became the headquarters of the Ulster Division RNVR this was under the control of the Admiralty and the Admiral Commanding Reserves At Queen's however the Admiralty's decision to create the new rank of surgeon probationer was well received and arrangements were made to promulgate the decision and to release temporarily from their studies medical students who desired to volunteer Ireland at that time formed part of the United Kingdom as did Trinity College Dublin the University Colleges of that city and of Cork Conscription it should be remembered was never applied to Ireland

Among the first students to volunteer from Queen s was Robin Hall who served for a time in a destroyer and at college had a distinguished athletic record being renowned for his performance in the long jump† His brother Hugo E Hall was already well advanced in his medical studies and qualified MB in 1916 after which he promptly joined the navy and served for the rest of the war as Surgeon RN in *HMS Concord* a C class cruiser After the war he joined the *Caroline* when the Ulster Division was formed in 1924 and became a member of staff of the Royal Victoria Hospital specialising in venereology His elder brother Robin rose to the rank of Surgeon Captain RNVR and for the rest of their lives both of the brothers retained their connection with the navy and were well-known figures in the RNVR In the Second Great War both were principal medical officers for a time at the naval bases at Londonderry and Belfast and spent some

* *After the war a University Services Club was formed to include all students who had served with the Forces and this included a small number of surgeon probationers An annual dinner was instituted and held each year in the university on November 11 The late Dr Robert Marshall published a short account of the history of the club on the 50th anniversary of its foundation 1968*

† *Throughout his life Robin Hall s principal attachment was to the navy After graduation he became Medical Officer to the Post Office in Belfast and Principal Medical Officer to the Ulster Division and served in the Second World War in the rank of Surgeon Captain RNVR*

years later at sea Hugo as PMO of the aircraft carrier *HMS Furious* It is difficult to trace all the names of Belfast students who served as surgeon probationers but among the first to be included between 1914 16 were Sam Acheson Hugh Paul W J Lytle George Percy Storey Henry Poston J B Wiley and George McFadden all of them students at the Royal Victoria Hospital Belfast

Samuel Acheson served on *HMS Lassoo* k a destroyer based at Harwich in the North Sea After graduation in 1918 he joined the navy as a Surgeon Lieutenant and subsequently entered into general practice in East Belfast

Hugh Paul who served on *HMS Shark* but before Jutland and after graduation at Queen s became Deputy MOH at Oldham Lancs

William James Lytle from Magherafelt Co Derry also served on a destroyer in the North Sea On return to Queen s he graduated MB in 1918 and subsequently took up a surgical career becoming a consultant on the staff of the Shefield Royal Infirmary

George Percy Storey an active Queen s student and an international hockey player volunteered in the navy in 1916 and served on *HMS Orion* at Scapa Flow with the Grand Fleet He was discharged in 1917 when his ship was lost off the Orkneys Fifty were only two survivors

Henry Poston served on *HMS Eagle* a destroyer in the North Sea in 1916 He graduated at Queen s in 1919 and subsequently moved to Manchester where he became orthopaedic surgeon and consultant in the staff at Ancoats Hospital

James Brown Wiley a native of Castlederg Co Monaghan served in *HMS Shark* in a destroyer with the Grand Fleet and graduated at Queen s Belfast in 1920

George Dixon Fisher McFadden of Newtownards Co Down After spending a time at Haslar Hospital where he contracted typhoid fever was appointed to *HMS Archer* at Fort in the Channel approaches where he had the extraordinary experience of being washed overboard and after being carried some distance away from the side of the ship being washed back onboard except for some minor bruises Subsequently his ship was sent to the Mediterranean and he was based at Malta and Mudros and engaged in convoy escort work He graduated at Queen s and later became Senior Surgeon to the Belfast City Hospital

George Storey and George McFadden were good friends Both did a preliminary period of training at the Royal Naval Hospital Haslar where McFadden unfortunately took ill with enteric fever Before leaving to join his ship Storey paid McFadden a visit in hospital bringing him a pack of cards and teaching him how to play patience It was the last time I saw my friend McFadden recalls Treatment in those days of typhoid fever amounted practically to starvation McFadden remembers how he was allowed only a small teacup of milk or Horlicks four times a day and nothing else was given for weeks Looking at his legs they appeared so wasted that the knee joints stood out so prominently as to resemble Charcot s joints and when he was allowed out of bed he was unable to stand and had to spend some weeks learning again to walk After six weeks sick leave he was appointed to *HMS Archer* a destroyer stationed in the Firth of Forth at the time and attached to the battle cruisers of the Grand Fleet Thereafter his ship was transferred to Plymouth for escort duty and a new captain Patrick Horan was appointed It was a very stormy autumn and winter with frequent gales McFadden was given the use of the tiller flat as a cabin in the extreme stern of the ship It was approached from the deck by a steel ladder and a manhole covering and formerly had been used principally as a wine store As the decks were often swept by seas in bad weather he found it safer to sleep in the wardroom placing the dining room chairs side by side with their backs and fronts alternating to keep him from rolling off the settee One night when conditions seemed more promising he decided to turn in in his improvised cabin in the tiller flat but was awakened by seas pouring down the manhole hatch which he had left open and he decided to retreat to the wardroom I picked up an old dressing gown as an extra and climbed on deck as I paused to fasten the manhole cover I was lifted like a cork and carried on a wave out to sea I could see the ship silhouetted against the horizon steaming away about 100 yards distant although this was difficult to estimate — it might have been about half that At any rate I thought this is the end — death cometh sooner or later and the wardroom will be thinking in the morning that the doctor is having a long sleep Then next thing

[illegible] was seeing a light in the [illegible] I realised that I must be [illegible] Managing to grab the side and then striving with kicks of my legs as the ship rolled over I managed finally to clamber on deck and grab the four inch gun on the poop against which I steadied myself Than I decided to return to the stern flat for dry clothes and made another effort this time successfully to gain the wardroom I think it was the backlash of the sea that had carried me off the deck which was my salvation but I do not like to think or talk about the episode though I shall never forget it

After a winter spent mostly escorting merchantmen in the approaches to the Channel *HMS Archer* was transferred in May 1917 to the Mediterranean a Lieut Taylor taking over command of the ship from Horan There she was based in the harbour at Mudros on the Island of Lemnos in the Aegean and they were set the task of patrolling outside the Dardanelles to watch for the appearance of the German battle cruisers *Goeben* and *Breslau* which were still at large He was also engaged in escorting duty from Salonika to Alexandria and he remembers seeing one troopship packed with men of the Ulster Division including Maynard Sinclair* who ultimately was to become Minister of Finance in the Northern Ireland Government

Others who ultimately qualified in medicine at Queen s were released to the navy temporarily when they passed their second MB were Witham Caithness who served in *HMS Opportune* a destroyer with the Grand Fleet and on return to Belfast graduated in 1920 and later took up general and hotel practice in the West End of London After him came in 1917 Fred Allen R L Dodds Jimmy Gaussen Sydney W T Lee Fred Moffitt and Bob Pedlow At this stage my year had only [illegible] completed the first medical examination and began to prepare for the second in anatomy and physiology I remember in our zoology classes Professor Gregg Wilson giving us a fiery address on the desirability of volunteering for the Army appealing to our patriotism in a manner not unlike that quoted in Remarque s well known book All Quiet on the Western Front But I was determined to press on at Queen s for another year when I should be nineteen and ready to offer my services as a surgeon probationer Indeed a year later many students who had completed their second MB entered the Service They were W A Beck and W E Beck W A Browne and others named Christian Johnston Lyle Duke Eaton Lascelles McCartan not returning to Queen s to resume their studies until March or April 1919

Frederick Martin Brice Allen served with the Grand Fleet at Scapa Flow in 1917 as Surgeon Probationer to *HMS Miranda* and graduated in 1920 at Belfast with honours Later he became Professor in Child Health at the University and was the author of a well known book on diseases of children Following the founding of the Ulster Division Allen RNVR he joined and for some years was an active member of the Division

Robert Leslie Dodds who also served with the Grand Fleet as Surgeon probationer to *HMS Matsuliake* graduated at Queen s in 1920 and subsequently took up gynaecology and obstetrics until his premature death as a comparatively young man I remember he told me that he had been sorely troubled by sciatica

James Frederick Herbert Gaussen graduated in Belfast in 1921 and after the war he entered the Royal Navy as a Surgeon Lieutenant making it his career and subsequently attained the rank of Surgeon Captain

Sydney William Timpson Lee of Aughnill Co Antrim who served in 1917 as surgeon probationer in the sloop *HMS Rosemary* later graduated MB in 1920 taking up a career in the Colonial Medical Service in East Africa

Frederick William Moffitt who served as a surgeon probationer in 1917 in *HMS Gerda* a destroyer at Scapa Flow attached to the Grand Fleet after graduating in Belfast went into general practice there

Robert Pedlow who served in *HMS Medina* as surgeon probationer graduated in Belfast in 1923 later going into general practice in Lurgan

In my own year which entered for the second MB in June 1918 there was still no lack of volunteers for surgeon probationers and there was no delay in our applying for and being commissioned, but owing to the

* He was lost in 1953 when the *Princess Victoria* the Larne/Stranraer ferry was sunk during a great gale

fact that at Queen's clinical work in hospital was not introduced until the commencement of the third year we were all inexperienced in medicine and surgery being able to acquire what knowledge we had from a few weeks spent in the wards of the Royal Victoria Hospital and such naval hospitals as Haslar Our position indeed was very similar to that of a surgeon probationer Stanley Sykes* He remembers how gratified he was to be promoted to the title of doctor as soon as he stepped on board and how he found two chests of medicine and drugs and a generous supply of surgical dressings with a few instruments sutures clinical thermometers and a hypodermic syringe with a bottle of morphine solution together with a small steriliser He was very well prepared for treating everyday cuts and burns but found it not possible to do much in the way of medical treatment One difficulty lay in there being no sick bay consultations for treatment having to be given on the upper deck or in the dark dril le suit store which was cold and damp If water was required it had to be fetched in a basin from the galley and he had of course no sick berth staff to assist him He had tried sleeping in the lobby or wardroom in a hammock but this often hit the stove pipe so violently on one side and afterwards rebounded against the rifle rack on the other side that in time he gave up sleeping in a hammock preferring one of the wardroom settees One night however when he forgot to raise the bunk board he found himself shot off on to the deck with his head in the fireplace He followed the approved plan of giving lectures on first aid to the ship s company these taking place during working hours because it was impossible to arouse any interest in the men during their leisure periods of [illegible] and mend In these lectures he tried [illegible] them how to recognise a fracture and in dealing with burns how to apply picric acid dressings The majority of the cases he saw in his ship were colds coughs cuts burns and bruises Constipation was a frequent complaint and attributed to the lack of exercise and shortage of vegetables but shortly after commissioning there was an outbreak of diarrhoea which was put down to contamination of the water supply There were two cases of scabies one of secondary syphilis one of gonorrhoea and two of impetigo He had to send one man to the depot ship with an inguinal hernia which was on the point of becoming strangulated He found the little glass tubes supplied with needles already threaded and sterilised excellent for dealing with bad cuts and in spite of the difficulty in ensuring aseptic operating conditions suppurating fingers thrombosed piles boils and whitlows all progressed satisfactorily

In a short article by surgeon probationer S H Waddy* he mentions that he had been appointed to a destroyer of the latest type At night he slept on one of the wardroom settees and on the coxswain s suggestion a small sick bay was provided for him by conversion of the drying room under the break of the forecastle This space not more than a few feet square was big enough to hold the medical stores sterilising instruments and tubes of Nargol jelly and calomine cream together with a bottle of mist pectoral lead lotion and tablets of potassium permanganate Each bottle was held in position in a wooden square so that in bad weather it did not break or spill In the corner was a strong shelf to which a Neil Robertson stretcher was affixed against the after bulkhead First aid bags were hung on the bulkhead by hooks ready for distribution to the chief points where injuries from wounding might be expected

* *Royal Naval Med Serv Vol 3 1917) When he arrived on board his first ship described himself as a land lover of the deepest dye never having seen warships before except in a cigarette picture and my sea experience being confined to four cross channel journeys*

* Royal Naval Med Serv Vol 4 1918

Periodically the ship's company was inspected and a gargling routine instituted. Once when a suspected case of cerebrospinal meningitis was discovered the messdecks were washed down with a solution of Lysol.

Both Mr Sykes and Mr Waddy refer to the discovery of rats. Waddy pointing out that their presence was regarded by the sailors as being a good omen. When one of them was asked what would happen if a rat were killed on board he declared that means we are going into action. Sir. Both writers spoke kindly of their experiences at sea which they were sure gave them an understanding of human nature as well as satisfying to some extent their nomadic instincts. It had been a pleasant change for a medical student proverbially impecunious to be paid to learn as an officer after years of paying to be taught as a student.

To revert to Queen's and the late of Belfast students. Unlike our predecessors during the war most of whom were drafted to ships at Scapa Flow, the Forth of Clyde, Harwich or the Dover Patrol, most of the surgeon probationers in my year were appointed overseas to destroyers or sloops in the Mediterranean.

There were:

Arthur Hugh McCulloch Eaton who served in the sloop *HMS Hollyhock* in the Mediterranean, graduated in Belfast in 1923 and became Consulting Surgeon to the Tyrone County Hospital, Omagh.

Richard Sydney Allison served in *HMS Acorn*, a destroyer working on the anti-submarine barrage at Brindisi in the Adriatic. After graduation was subsequently appointed Consultant Physician on the staff of the Royal Victoria Hospital.

Thomas Howard Cromer also served in the Mediterranean in the sloop *HMS Lobelia*. Qualified MB in 1931 and FRCS became Consulting Physician on the staff of the City Hospital, Belfast and of the Royal Victoria Hospital.

John Scott Lyle from Newtownards, Co Tyrone. After a short period at the Royal Naval Hospital Haslar, became surgeon probationer in *HMS Alarm*, a destroyer. Qualified at Queen's in 1922 and went into general practice.

William Alexander Beck was also sent to the Mediterranean and became surgeon probationer to the destroyer *HMS Bylandt*. He graduated in 1921 and went into general practice.

Walter Lasalles Ferguson of Downpatrick, who served as a surgeon probationer, qualified in Belfast in 1922 and went into general practice.

William McCarton of Castlewellan, Co Down — surgeon probationer, qualified in 1922, served for a time as Surgeon probationer to the sloop *HMS Penstemon* in the Mediterranean, seeing service in the Levant in operation with the military forces under General Allenby. He subsequently became Medical Officer in Charge of the Sussex County Hospital, Hayward's Heath.

John Herbert Duke who was surgeon probationer to the destroyer *HMS Vendetta* and served with the Grand Fleet, qualified in 1921 and held appointments as Consulting Physician in Geriatric Medicine at St Andrews Hospital, Bow, London.

William Aiken Browne of Holywood, Co Down, served in *HMS Versatile*, graduated in 1922 and ultimately became Senior Administrative Medical Officer, Northern Ireland Hospitals Authority.

There are three other names of medical students who served as surgeon probationers in the last year of the war, but details of whom I am unable to trace. They were **W. E. Beck** who served in the destroyer *HMS Obdurate* and later went into general practice in Belfast, **Charles Ronald Christian,** who served in the sloop *HMS Cyclamen and* **Robert Johnson,** who served in the armed yacht *HMS Campanula* both qualifying in 1921 or 1922.

Chapter 4

Experience in Action

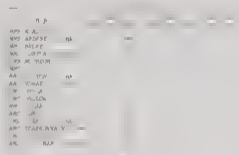
In the First Great War it was uncommon for ships to experience frequent bouts of action with enemy vessels (apart from submarines). At the Battle of Jutland — fought on May 31 1916 — the majority of the seventy or eighty British destroyers involved were staffed by surgeon probationers. Cerebrospinal meningitis was prevalent in the Fleet in that year and one surgeon probationer from the Belfast Medical School, A. E. W. Gallagher by name, who was serving in a destroyer when first attracted by the sound of gunfire and went on deck to observe the opening phase of the battle, lost his balance and fell down a ladder at the wardroom hatchway, and sustained minor injuries at first attributed to trauma but which later proved to be related to the onset of cerebrospinal meningitis from which he was later invalided.

Of the destroyers taking part in the battle some were attached to the battleships of the Grand Fleet based at Scapa Flow and the others mainly came from the Forth and were attendant on the battle cruisers The 4th flotilla which included *HMS Tipperary Acasta Achates Ardent Ambuscade Fortune Shark Spitfire* and many other destroyers came under heavy enemy gunfire *HMS Tipperary* being put out of action after being in contact with some enemy four funnelled cruisers and being hit by a German salvo a heavy and accurate fire being directed on her until finally she burst into flames and was left a blazing wreck until she sank Meanwhile notably other ships such as *Spitfire* and *Broke* had been under severe attack the latter as a result of crashing into her next astern *Sparrowhawk* had had her stern blown off and was abandoned as a helpless wreck before she sank Other ships of the flotilla which suffered severely during the fighting were *Fortune* and *Ardent* both being sunk Of *HMS Ardent s* crew there were only two survivors and from the *Fortune* only two raft loads of survivors were rescued

Altogether in the battle there was a total of 6 685 casualties composed of 363 officers and 6 322 men In the destroyers alone 38 officers and 483 men were killed 8 officers and 75 men wounded and 9 officers and 150 men taken prisoners-of war (Table I)

From these official figures for casualties among the destroyers it will be obvious that the surgeon probationers who were entirely alone and had no other help were kept busy during and after the action dressing and attending to the wounded Taken prisoner of war was the surgeon probationer of the *Tipperary* who was picked up on a life raft by a German ship and taken to Holland in a Dutch trawler He had been wounded in the leg during the action

In the *Onslaught* which was the rear ship of the 1st Division of the 12th Flotilla the



captain was badly wounded the 1st Lieutenant coxswain and one signalman were killed and the surgeon probationer kept fully engaged attending to the wounded All his efforts however failed to save the captain who died of his wounds about noon of that day

Another ship HMS *Petard* was hit six times by shells one of which penetrated No 2 stokehold and cut an oil fuel pipe setting oil alight Luckily the engine room department was able to shut off the oil to the broken pipe and extinguish the fire in a few minutes The enemy s first salvo had hit the after part of the ship and killed or severely wounded all the officers and crew of the after 4 inch gun this salvo also wrecked all the officers cabins and unfortunately killed the surgeon probationer just at the moment when his services were most required It was not until daybreak that the surgeon probationer of HMS *Nicator* could go over to the damaged *Petard* to give assistance Nevertheless with only a destroyer s medical outfit and no anaesthetics he performed wonders and undoubtedly saved a number of lives

After an attempt by a German cruiser to ram HMS *Spitfire* and the loss of her foremast with fire breaking out the crew stood by and attempted to deal with the situation by use of fire pumps Among the official records few instances of individual bravery are recorded for posterity but the record of one surgeon probationer an young doctor by which title he is cited was exceptional and he did some fine work

during the time. His chief accomplishment was to amputate single handed and without any anaesthetic an able seaman's leg who with the coxswain was found lying amongst the wreckage on the bridge. While he was performing this operation the fire party were busy around him with their fire hoses. It was marvellous the way this young doctor moved about eventually getting all the wounded into the wardroom and cabins and he never left them or took any rest himself until he arrived in harbour 36 hours later.

The surgeon probationer on this occasion was Mr Douglas George Patrick Bell a young man from the Newcastle area and Durham Medical School, who was decorated with the *DSC* for his valiant work and afterwards contributed an article on the battle to the University of Durham College Medicine Gazette. In his opening paragraph he apologised for bringing up the subject but hoped that his own impression of the action may not be uninteresting. He mentions that Wednesday, May 31 was a lovely day with the sun shining from a practically cloudless sky and the sea almost calm or motionless the horizon being surrounded by a haze.

Until about 7 bells in the afternoon watch (3.30 pm) we spent the day in a similar fashion to most of one does at sea — eating and sleeping intersperced with some desultory reading and on occasions walk up and down the quarterdeck admiring the magnificent sight of the squadrons of the Grand Fleet at sea. At about 3.30 pm I was on the upper deck just about to retire to the wardroom for seven bell tea when I noticed an unusual number of signals flying from the Iron Duke on whose port bow we were. The whole fleet then increased to about 20 knots and it was now evident that something unusual was occurring this being confirmed shortly afterwards by a wireless from the flagship announcing that our battle cruiser squadron was pursuing a German battle cruiser squadron and expected to come up with them.

At 4.10 pm we received another wireless which said that our battle cruisers were engaging the enemy. Shortly after this, about 4.30 pm so far as I remember, we took to the news that our 5th battle squadron was engaged with the German High Sea Fleet.

We now went to action stations the captain relieving the First Lieutenant on the bridge, whilst the latter took up the station in command at the after gun and generally so that everything was on the top line. I had a message sent down from the captain to get my bandages and instruments ready but they were always kept more or less in readiness in first aid bags near every spot likely to have casualties. Plaster and dressings were kept in the engine and boiler rooms. There was also another bag in the aircraft with a shoulder strap containing the hypodermic case and syringe instrument, alcohol, tourniquets etc. I also unearthed some empty gin bottles which I had filled with 1/20 cash dis which was all the antiseptic I had — the sem me bottles of red ochre having been flung overboard months before by the First Lieutenant after I in a moment of unwonted kindness had pointed his sister-in-law's bald head in admiration to his cerebral glands which had found occasion to be enlarged.

About 5.30 pm we heard the low booming of guns right ahead and in a few more minutes the dazzling white flashes of the guns became visible through the haze. We could see the opposing ships the Germans right away in the distance whilst Beatty's already badly damaged cruiser squadron was much closer. Hood with his squadron of battle cruisers was just ahead of the Grand Fleet and was engaging the enemy. In a very few minutes we saw his flagship blue Invincible go down. At the moment we thought she had been mined as tremendous was the explosion. The huge ship was blown completely to bits, the bow and stern being visible for several seconds before they sunk whilst debris and men were high in the sky high.

The action was now general the Grand Fleet having deployed in a line of battle stretched right across the sea from horizon to horizon as they launched salvo after salvo, creating a truly splendid infernal. From our position which might be compared to the front row of the stalls the German battle cruisers and light cruisers were visible, large columns of water were rising all round them until the exact range was found when several were seen to take fire and then heel disturbedly out of line.

The noise of the firing was indescribable, the hackneyed expression "thunder of the guns" conveys very little idea of the real thing. The whole show seemed like a great pandemonium to a novice at sea fighting. However being on the disengaged side of the fleet we were in no particular danger since from a few stray shots which were dropping here and there among the flotilla.

After about half an hour or more the guns seemed to divide as in the mist and the terrific battering subsided somewhat only to break out again with renewed vigour at intervals throughout the night. With the opportunity offered between the engagements of the alarm gong we all fire up on deck and refreshed ourselves with sandwiches and cocoa.

Up till about 11.30 pm the action was a most enjoyable sight and a great experience. At this hour however our flotilla went in to attack some German battleships and it now became too awful to be at all enjoyable. We were second in the line and in the 1st division of four the order being Tipperary, Spitfire, Sparrowhawk and Fortune, three out of the four ships in the 1st division being sunk and only surgeon probationer Bell's Spitfire surviving.

We attacked followed by the Tipperary at about 28 knots on getting close to the enemy we fired two torpedoes at practically point blank range on 800 yards. It was observed to explode all right and the vessel hauled over and sunk. We passed the Tipperary which was a ghastly sight — an mass of red hot metal from bow to stern. She sunk in about a minute. We were now close up to the Hun which had done for our leader (Tipperary) and at the moment when the collision seemed imminent and she loosed off

*[illegible] using, as [illegible] [illegible] [illegible]

five wounded and the *Broke* suffering more heavily losing 21 killed and 24 wounded most of them by a shell which burst in the boiler room The Commanding Officer of the *Broke* was Edward Ratcliffe Evans *CB* who was afterwards promoted to Captain and subsequently Admiral and was awarded the *DSO* The destroyer action was famous and notable because it was not until February 1918 that the enemy destroyers again ventured into the Straits I have been unable to trace the subsequent history of Mr Westwater but as regards Mr C T Helsham he graduated at Newcastle and Guy's Hospital obtaining the MRCS LRCP in 1919 Afterwards he was appointed to the local hospital and wrote an account of an unusual case of strangulated scrotal hernia with volvulus of the small intestine in the inguinal canal (BMJ 1921) He died in 1934 at the premature age of thirty nine

Another surgeon probationer, who was awarded the *DSC* in 1915 for conspicuous bravery while serving in a Q ship and served under the famous Admiral Gordon Campbell *VC* was Mr Alexander Conlts Fowler A native of Aberdeen he graduated MB ChB in 1919 and MD in 1923 He was Resident Medical Officer in the Royal Hospital for Sick Children Aberdeen and later became Resident Medical Officer of the Tor na Dee Sanatorium for pulmonary tuberculosis Especially interested in radiology on leaving the sanatorium he obtained in 1924 the Diploma of Medical Radiology and Electricity at Cambridge University thereafter returning to Aberdeen when he was appointed honorary assistant radiologist to the Royal Hospital for Sick Children and radiologist to the Kepplestone and Armstrong nursing homes Unfortunately for years he had been in ill health and at the early age of thirty-eight he died, his loss being greatly mourned Thus one of the numerous wreaths at his funeral bore the legend To a gallant shipmate To his friends he was always known for his gentleness and humility of character and his indifference to personal gain or praise although his many acts of charity and kindliness were well known He died unmarried

The last medical student to be awarded the *DSC*, serving as surgeon probationer during the war in *HMS Stork* was George Edward Strahan After the war he emigrated to Southern Rhodesia where he held a post in the Government Medical Service An LRCPI and LM LRCSI and M he graduated in 1921 in Dublin and for a time held a house appointment in the Croydon General Hospital

Other instances in which British destroyers carrying surgeon probationers were attacked by surface enemy vessels were in the winter of 1917 At this time convoys of Russian ships were running across the North Sea from Norway to Britain under the protection of the navy and destroyers were engaged in two brief actions in North Sea with the fast German light cruisers *Bremner* and *Bremse* which succeeded in sinking many of the ships in convoy including their escorts which vainly attempted to protect them from a superior force The first occasion occurred when *HMS Strongbow* and *Mary Rose* and their convoy were attacked in the month of December many of the survivors of sunken ships being gunned whilst in the water or perishing of the cold The surgeon probationer of *HMS Strongbow* was a Mr Ian M Thompson and unfortunately we have no record how he was lost With regard to Ivan Barclay surgeon probationer of the *Mary Rose* however it appears that he did not take part in this action his death having occurred earlier on October 17, 1917, although there is no record of its manner The first indication of the impending engagement was at about six o clock in the morning when the convoy was seventy miles east of Lerwick and look outs in *Stronghow* reported two strange vessels

steering on a converging course On board the *Strongbow* action stations were sounded but the vessels failed to reply to the challenge and before the crew had time to clear away the guns and torpedo tubes the *Strongbow* had been rendered helpless and her decks covered with dead and wounded men many of the hands in the engine room being scalded to death and those on deck being struck down by the well directed fire of the enemy The casualties were very heavy and the ship was abandoned at 7 30 am As for the *Mary Rose* she had been heard and seen firing astern and had turned back suspecting the presence of an enemy submarine but the German gunners found the range and as in the case of the *Strongbow* her end came swiftly A Sub Lieutenant and a handful of men mananged to scramble on to a Carley float and were subsequently picked up not only two members of the *Mary Rose's* ships company rechad the Norwegian coast near Bergen and were rescued

On the second occasion of the same kind when a convoy running between Norway and Britain was again attacked by the same cruisers the destroyer *HMS Partridge* was put out of action and sunk Her surgeon probationer Mr Peter Faichney was rescued and taken a prisoner of war by the Germans He had been serving in the ship since July 1917 and was due for demobilisation early in the year 1918 but in December 1917 the orders for his demobilisation had to be rescinded because he had been taken prisoner of war Steps were put into action by the Admiralty in March 1918 to have his position reviewed on account of his being a medical student and he was repatriated finally on the March 22 1918 after spending a few months as a prisoner in Holland In April 1918 his application to be demobilised to complete his studies was favourably received by the Medical Director General the Dean of Glasgow concurring and he was released to resume his studies qualifying MB BCh in 1921

Another student George F Abercrombie belonging to the same generation as the brothers Robin and Hugo Hall but this time having a long and distinguished connection with the London Division became a surgeon probationer in September 1917 on passing in anatomy physiology and only having three months clinical experience at Addenbrooke's Hospital Cambridge* He served over a period of ten months in five different destroyers *HMS Onslaught Lightfoot Velox Warwick* and *Trident HMS Warwick* was selected by Admiral Keyes as his flagship for the forthcoming operations against Zeebrugge and Ostend in April 1918 and Abercrombie recounts

> *We therefore sailed in St George's [illegible] Vindictive [illegible] the mole at Zeebrugge at [illegible] As [illegible] approached under [illegible] [illegible] the block ships Intrepid and Iphigenia*
>
> *[illegible] Make [illegible] I said [illegible] Mustard and [illegible] I said [illegible] He [illegible] 20 [illegible] had*

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*See Naval Occasions Jnl Med Digest Vol 19 No 3 March 1974 pp69 70

[illegible] machine gun fire at their way out of [illegible] so much rowing on the mess tables and [illegible] and [illegible] the deck staff under the [illegible] We did [illegible] dressing their wounds going the [illegible] in full blast [illegible] as comfortable [illegible] with blankets cocoa and so on [illegible] the morning, when I straighten[illegible] up [illegible] there a moment I told the Admiral [illegible] and his Captain [illegible] and [illegible] deck talking, everyone cheering [illegible] and [illegible] their work [illegible] the [illegible] things in battery

About the same date in the last year of the war the Allies the British and Italians maintained an anti submarine barrage to prevent German submarines gaining access to the Mediterranean which they penetrated successfully both through the Straits of Gibraltar and through the Austrian naval bases at Pola and Trieste The barrage extended across the Straits of Otranto and was of several lines consisting of trawlers sloops kite balloons and destroyers

One night two Austrian cruisers pounced on the barrage at midnight sinking a number of drifters damaging a destroyer *HMS Hornet* and sinking another *HMS Phoenix* outright The surgeon probationer of the latter ship was a William Balfour and he perished in the action with his ship

To be continued

LETTERS TO THE EDITOR

Sir

The Rabies Red Alert

When I look round and observe the efforts and preparation which are being displayed by the energetic and vigilant responsible authorities in order to stonewall the awful threat of a rabies invasion from abroad I cannot help but recall the stirring words of a Former Naval Person which could so profitably serve this Nation once again today as they did then for a rallying cry in the present anti rabies campaign

We shall fight on the beaches
We shall fight on the landing grounds
We shall fight in the fields and in the streets
We shall fight in the hills
We shall defend our island

I am etc

Wally Vella
E E Vella Colonel L/RAMC
Assistant Professor of Pathology

Sir

'Signal Medicine'

I read Peter Preston's article on Codding and radio medicine with interest (JRNMS 62 p45)

I once successfully treated by signal over a period of 7 or 8 days a patient who was on board a submarine on passage to Australia He was suffering from cellulitis which was secondary to an infected knee graze sustained on an all weather cattle soiled football pitch The area involved spread rapidly until it covered most of the right and was very alarming for the Commanding Officer as well as the patient who was really very ill

At the time of the original call for help the submarine was nearly 1 500 miles west of Acapulco In the middle of nowhere and I was at *HMS Dolphin* something over 7 000 miles away

I cannot remember how many signals were exchanged before the pyrexia began to subside Can anyone better this distance for Signal Medicine ?

I am etc

L G le Clercq, QHS MRCS, LRCP
Surgeon Captain R N al Navy (Retd)

P S I forgot to add above that it also alarmed me!

Sir

May I congratulate you on the new covers of the Journal It is a very pleasant change from the previous psychedelic horror Also my congratulations to the two medical officers who are willing to stand up and be counted by questioning the fundaments of the RN Medical Service (Letters Spring 1976 issue) For nearly forty years I have wondered about this twenty one while on the active list and for the past eighteen since retirement Probably it was wondering too loud during the first period which resulted

in its entirelment!

While on my current Royal Navy refresher course the TV series 'Warship' I was astonished to find that the Commanding Officer of a ship and presumably of any other establishment can still send to the Sick Bay for a man's medical records — as in the episode Away Sea Boat's Crew by John Armstrong While the RN Medical Service has made tremendous technical and organisational advances since my retirement it is regrettable_to me_that medical records are not yet confidential documents

From this distance in time and space the Warship series is hard to criticise but I would have thought a ship with *Hero's* complement_often on detached duties and with a commander in command would have merited a regular medical officer presumably they were all busy doing esoteric courses Also I thought the diving episode was unrealistic the divers going up and down to a submarine sunk in 150 feet of water like a bunch of yo yos

For any of your readers who are wondering what to do after their Service career I suggest thay consider coming to this lucky country Australia if not a paradise has a lot of good solid worldly advantages going for it and there is still plenty of opportunity for doctors There is a particular need for these in the small country one doctor towns in which he has his own hospital where he can tackle anything of which he thinks himself capable These little towns are often attractive and have excellent cultural and sporting facilities It is in these that the general practitioner is still doctor under God My only regret about coming to Australia is that I did not do so when 10 years younger

Yours etc
Gerald L. Hardman
Surgeon Commander RN (Retd)

The implied criticism of medical confidentiality contained in paragraph 2 of Dr Hardman's letter is based upon a fictitious story which only purports to reflect real Service situations Medical documents are protected by a MEDICAL IN CONFIDENCE classification and are only released for essential ethical purposes

Editor

SERVICE NEWS

THE ROYAL NAVY MEDICAL CLUB DINNER 1976

The annual dinner of the Royal Navy Medical Club was held in the Wardroom Mess *HMS Nelson* on Friday September 10 1976.

The President Surgeon Vice Admiral Sir James Watt KBE QHS MD MS FRCP FRCS made the following speech

"Commandant General Royal Marines Commandant in Chief Immortal guests members of the Royal Navy Medical Club

When it became apparent that the Painted Hall would not be available for our dinner this year Commodore Hayne generously offered the hospitality of *HMS Nelson* and I am sure you will agree that the Wardroom Mess provides a fitting background for the traditional and convivial occasion You will also wish me to thank Commander Howes and the wardroom staff who have spared no effort to ensure the success of this dinner It has been made even more enjoyable by the union of the Royal Marines Band of the Commander in Chief Naval Home Command under the direction of Warrant Officer Hough

The history of *HMS Nelson* is instructive The naval hulk moored off Portsmouth between Gosport and Southsea the commission of the Napoleonic Wars in 1815 when the duty daily in hulks that offered appalling accommodation and worse food provoked formidably discouraging to the volunteer recruits on whom following the abolition of the Press Gang the Navy was obliged to depend for the manning of the Fleet Roundly condemned by successive Commanders in Chiefs the hulks were nevertheless cheap and during remitted finance all ashes the building of a naval barracks continued to receive low priority It was not until 1903 that some 4000 officers and ratings were at last comfortably housed in the new barracks then named *HMS Victory*

Between the wars the Admiralty was reluctantly obliged to concede that the sailor was as much entitled to a legitimate share and state as his medium of Army counterpart It was coincidental that this dawning realisation again coincided with financial austerity provided no excuse for vacillation on housing the married sailor Finally it was a voluntary organisation which in 1933 gripped the problem The Portsmouth Victory Housing Society was born and provided 132 low rental houses a shop and post office at a cost of £40 000 — a welcome first step in family welfare

Because of the association with Nelson's flagship the name was changed in 1974 to *HMS Nelson* and one of the [illegible] in this room [illegible] Harold Wilson [illegible] by Nelson to Barham? Fast [illegible] September 13 1805 this day be[illegible] to join *Victory* at Portsmouth [illegible] commands John Snipe Pilot [illegible] Fleet who had met the [illegible] to negotiate a change supply [illegible] Home Fleet This letter [illegible] minister and a dozen [illegible] the fleet of a competent medical [illegible] did he almost to foster He gave [illegible] for the naval hospital in Malta [illegible] advocate of postgraduate medical [illegible] naval surgeon His adoption of [illegible] huge [illegible] diet ship habitually [illegible] by the medical reformers of the [illegible] century [illegible] naval Welfare [illegible] Trafalgar as his medical brilliance A old Captain [illegible] the bicentenary of whom [illegible] this year would no doubt [illegible] that those medical relations [illegible] to the successful [illegible] navigational expert [illegible]

A medical [illegible] radical has occurred in recent years in the result of the advent of the nuclear component and the [illegible] sophistication of the surface fleet its aircraft and its weapons systems Medicine has become highly developed science employing [illegible] difficult sophistic A textbook of Maritime Medicine under the editorship of Surgeon Commander David Elliott will shortly be published covering the broad scope of this new specialty by contributors from serving naval medical officers

The high medical standards the Fleet and shipping for a variety of employments in [illegible] environment requires [illegible] recognised that temperate [illegible] considerations should not permanently [illegible] the majority of the Medical Service in fulfilling a role of maintaining the capability of the fleet though skilled medical care and that essential main [illegible] expertise which anticipates disease [illegible] problems associated with operations of the Royal Navy and Royal Marines on sea and land in the sea middle this sea and in the air I know that [illegible] well understood by the Commander in Chief Admiral Sir

[illegible] night and I welcome [illegible] sailor and as a [illegible] Service from whose [illegible] to him as [illegible] He is also a [illegible] general practice [illegible] exist in [illegible] Royal Navy and [illegible] families are [illegible] I am [illegible] Air Marshal Sir [illegible] Dhenin [illegible] and the Royal Air Force Medical Services [illegible] in providing us with [illegible] general practice [illegible] the United Kingdom [illegible] the RAF [illegible] in Northwood is finally [illegible] to the Royal Navy [illegible] General Sir James Baird Director General Army Medical Services has offered [illegible] and the new [illegible] Unit at Haslar [illegible] now available. Both my fellow Directors General [illegible] meeting and I welcome them as friends who share a common desire to work together for the benefit of our respective Services.

Another of Wylie's [illegible] depicts the Battle of Copenhagen. You will recall that it commemorates the famous occasion when Nelson put his telescope to his blind eye in order to ignore Admiral Hyde Parker's signal to discontinue the engagement.

The telescope however appears to be less popular in the Ministry of Defence where during the past Defence Review period an optical instrument has appeared with which the Medical Service is more familiar. During the past year we have been required to view each medical facility in terms of expenditure and [illegible] through the high power lens of the [illegible] microscope.

The Surgeon General of the United States Navy has [illegible] warning[1] about the application of [illegible] without proper appreciation of the consequences of constraints upon contingency planning, education and training programmes, [illegible] and the spectrum and standards [illegible] unlike the Treasury doctors are less [illegible] with size and organisation than with [illegible] We have therefore used three [illegible] to examine our recently [illegible] Medical Service in terms of its essential [illegible] and its viability for the foreseeable future. I [illegible] report that the new situation, which [illegible] departure from centuries of tradition [illegible] sound and that the three Surgeon Rear Admirals [illegible] are solving their own methods [illegible] under continuous surveillance the areas [illegible] It has meant that the views of the [illegible] and rating are able to be represented through the appropriate Surgeon Rear Admiral at Medical Department meetings and find their way into discussion papers which lead to the formulation of Medical Department policy and to Board submissions.

While the structure is basically sound that is not to say that radical changes should be excluded for the [illegible] There is a need for more economical use of establishment manpower. Hospital costings, bed occupancy throughput and the quality of the clinical workload are under scrutiny. Nurse training and medical assistant training require a new look and we are about to introduce a new dual for medical assistants with the SEN qualification while more [illegible] career opportunities especially in technical disciplines are required for our highly qualified and professionally competent Medical Services Officers [illegible] to the General List. There is a need to [illegible] medicine [illegible] especially in the first [illegible] exclusion of less important areas and [illegible] research, retirement and [illegible] review and rationalise these [illegible] tasking we now [illegible] the Royal Marines in the light of experience with the new Medical Squadron and the 3 Surgical Support Team in which the Royal Naval Reserves play a prominent role [illegible] undermined by expenditure cuts. In all these areas [illegible] the 3 Surgeon Rear Admirals are [illegible] consultation with the staff.

With the help of *HMS* [illegible] the Dental Service has adapted to the changing shape of the Navy by providing the dental officers afloat with compact dental equipment that can accompany him on his [illegible] transfer at sea to keep the small ship sailor dentally fit. This affords me an opportunity of welcoming another of our guests, Major General Galloway, Director of Army Dental Services.

Building programmes for the naval hospitals at Haslar and Plymouth and the Institute of Naval Medicine are on schedule and progress has been made in the manning of hospitals at junior doctor level but this will not be fully resolved until we are able to make good our shortfall in medical manpower exacerbated most recently by the strain of the Cod War. We need more young doctors of the calibre of those now being attracted to the Services from the rather unhappy climate of current civilian practice where in spite of [illegible] efforts of the Presidents of the Royal Colleges to arrest declining standards the situation is extremely serious. Tonight we are privileged to have with us Sir Rodney Smith President of the Royal College of Surgeons of England and Professor Dewhurst President of the Royal College of Gynaecologists and I should like them to know how much we appreciate their efforts on our behalf and their willingness in the midst of their many commitments to be with us.

We will not retain our admirable young men by TV documentaries on the less attractive side of naval life but by providing the right career opportunities and a satisfying and secure professional life. There is one other thing. The heroes of the great sea battles depicted on the walls of this mess led their men by [illegible] example and if we are to retain those young doctors who have tentatively committed themselves into our hands we must provide leadership of that quality. Sir Frederick Catherwood[4] has said recently that management must be creative, [illegible] not static and administrative. There is still too close an affinity between [illegible] and [illegible] This need not be so. For instance it is gratifying to see how the Institute of Naval Medicine and its Surgeon Rear Admiral have achieved such influence in the medical aspects of [illegible] operations.

In the year 1742 a Portsmouth naval surgeon John Atkins[5] proposed a naval medical centre in the Portsmouth Academy with anatomical and pathological museums and an amphitheatre for monthly lectures together with a small kitchen and a little parlour or two to withdraw, wash hands and smoke a philosophical pipe after business. He also [illegible] advocated a national health service.

John Atkins saw what is now patently apparent to us, that [illegible] medicine [illegible] in collaboration with civilian colleagues and it is therefore a special pleasure to welcome Dr McKee, Regional

Mr [illegible] Health [illegible] Ill [illegible] Hon [illegible] been established [illegible] Surgeon R[illegible] thought [illegible] we can [illegible] and effect [illegible] services [illegible] shipping [illegible] Central [illegible] Health [illegible] Arkan with [illegible] traditional [illegible]

The United States Navy well repaid [illegible] thought by medical [illegible] serve of the International Naval Medical Congress held in London in [illegible] by Mr [illegible] which points to the battle between the *Shannon* and *Chesapeake* [illegible] the famous victories which fell to the Royal Navy during the unpopular American War of 1812, and we hail among the chief impelled to report it for posterity. Samuel Leech [illegible] a team in the *HMS Macedonian* [illegible] present by her captain the United States [illegible] another engagement was quickly won — [illegible] — by American hospitality and opportunity settled in the United States. On a visit to England at a later date he was appalled to find such high taxation industrial unrest low pay and high cost of living. Perhaps an American guest will be forgiven if this conclusion that little has changed.

Malta's other naval. The last fight of the Revenge has also a link with America for it commemorates an unpublished feat of heroic by that great Elizabethan Sir Richard Grenville who helped to enforce Virginia. In an action off the Azores in 1591 in the flagship Drake had used against the Armada and with half his ships company ill and unable to fight according to Sir Walter Raleigh' he took an unchallenged an armada of 53 Spanish ships. He sank 4 of them fighting until his ammunition was spent repelling boarders and counter boarding until all his pikes were broken and he and his surgeon mortally wounded. That was the glorious sign of England's history of merchant venturers Shakespeare Sir Francis Drake and the Antherund. Vision of the Bible which imparted a sense of purpose to life and spiritual values. Perhaps that is what we need to recover and it therefore gives me a great deal of personal pleasure to have with us Archdeacon Basil O'Ferrall the Chaplain of the Fleet for we are friends of long standing who share that conviction.

Our Principal Guest this evening is Sir Peter Whitaby Commandant General of the Royal Marines. In times of financial stringency the Royal Marines like the Medical Service, is a little vulnerable and the Battle of the Glorious Fourth Jutland the last of Wolfe's untoth reminds us that the run down of the Royal Marines in times of peace required ships to be hastily reinforced in times of war by Army regiments. So nearly the whole forecastle party of the Queen's Second Regiment were killed in a wonderful in Howard flogship the *Queen Charlotte* during that action.

Even more the Corps was founded by Charles II in 1664 just *eight* years after the Naval Medical Service in 1512 the Corps has been during its history an unique blend of excellence and a versatility which has enabled it to adapt to each changing defence situation. It is therefore scarcely surprising that the Royal Marines who during the war of the Spanish Succession demonstrated their amphibious audacity and [illegible] [illegible] been [illegible] Hel[illegible] special [illegible] the world.

Thus characteristic [illegible] toast [illegible] Principal Guest this evening Brigadier General Whitaby [illegible] naval ships. He then became [illegible] the Fleet Air Arm Block with the Royal Marines [illegible] 41 Commando before returning [illegible] Fleet. During the Borneo confrontation [illegible] 42 Commando and in 1970 was given the Major General Commando Forces. Throughout his career [illegible] have been interspersed with staff training. He has also showed spiritual optimism [illegible] 1969 he became the only Royal Marine [illegible] Chief of Staff in Commander in Chief Allied Forces Northern Europe. He [illegible] and holds a watchkeeping [illegible] wide cultural [illegible] Finnish and Italian [illegible] amphibious [illegible] Captain.

Members of the Royal Naval Medical Club [illegible] the health of our guest.

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Lieutenant General Sir Peter Whitaby KCB OBE Commandant General Royal Marines replied on behalf of the guests

Mr President, Commander in Chief, Members of the Royal Naval Medical Club, fellow guests

I feel very conscious of being a rippingman the only drop of blood in an otherwise circular dark blue uniform and in fact probably also the only human present for I can merely include the Archdeacon in that category. It is most distinguished and honourable gathering.

I think you Mr President for your kind remarks about me but I feel I should say that I think tonight you may have chosen the wrong man to reply to the toast. My own brother is a surgeon of some distinction and on the day he qualified knowing his capabilities well I remember swearing that I would not fall into his hands until my dying day. I suppose that inbreed mainly I must have included the rest of the profession in that resolution because although as your President remarked I may have lived dangerously I am always professional keep within and therefore a very bad customer for you.

However as a Corps due to the nature and robust nature of our training and operations I believe we can

efforts that will provide you with more then just few sheets of work.

May I start with a brief digression prompted by noticing on the programme of music a composition by Surgeon Captain Kinsman. While congratulating him I also feel that perhaps the Royal Naval Medical Service might take a leaf out of the book of the Royal Army Medical Corps and found their own band. The flights of fancy could be very interesting. Mozart's Oboe Concerto arranged Kinsman for C. Sharp, Cathedral music Beethoven's Mouse for Wind Band, orchestrated by Bonthardin and Bedgen.

May I like to Vice President be permitted to take a flight back into the past and then lightheartedly the association between the Royal Marines and the Royal Naval Medical Services.

The history of the Royal Marines dates off chiefly from when it considered to be a legitimate birth in 1664 and although by then reckoning it is certainly junior to the Royal Naval Medical Service it had many illegitimate forms before that time and has suffered from an equal number of misconceptions since.

The Navy has suffered for many years from chronic shortage of manpower and that had been alleviated from time to time by drafting in battalions from the Army in Fill the gaps. We were formed in the Duke of York and Albany's Maritime Regiment in do precisely this so we were alongside the Service and tackling the same problem but in different angles.

Stories for this period show that for every seaman killed in action or died of wounds 4 others succumbed to sickness and were usually carried out feet first. No one probably has recorded the properties of those whose lives were terminated as a result of the ministrations of the apothecaries and surgeons!

They were hired times for all of us. Surgeons and their mates were recruited locally and sent to sea pay rate 4 with no medical qualifications at a cost of about £4 to £5. The Surgeon himself was paid £2 10s a month while his mate got 30s for carving the bag of tools. By comparison the Marines were paid 24s a month from which that had to contribute 6d to the Chatham chest 4d to the Chaplain and 2d to the Surgeon. Was this a bribe? I think that it was an official recognition that under chancel circumstances.

Hitherto I have been repeating itself. At that time the Surgeons were notoriously hard up and attempted to indulge in private practice even though they would be sacked if found out. They could augment their income by bowdlerizing treating venereal disease at a price to civilians. The seamen had to pay 30s for treatment but only if and when they had been successfully cured. But strangely enough the Royal Marines only had to pay 15s. Did the sailors have a tougher body or twice as much or perhaps both.

The Royal Naval Medical Service was a family affair organisation during those times. Commissioners for health were appointed at the beginning of each war and disbanded at the end of it. However after the third Dutch War the post of Surgeon General note the title General not Admiral was created in perpetuity and it is interesting that this appears to be a continuing tradition. The Surgeon General's rate of pay was £100 a year which provided him with a differential of roughly three times that of the Surgeon serving at sea.

I have to confess I too much on the medical side at the expense of Royal Marines matters. One finds an interesting connection at this time of the Dutch and Spanish wars when some bright marine had the original idea of climbing into the rigging and shooting with muskets from the tops picking off the enemy officers instead of just blasting away into the bowels of the enemy ships. This was a highly successful technique and not surprisingly the ethos rule reorganised it and made the copyright so that what had once seemed a good idea to the Navy was now considered to have become an unacceptable interference in the serious business of sailing the ship. It was in this manner that eventually Nelson was shot which was well known started the strange love have intimacy which seems to have existed for so long between the Royal Navy and the Royal Marines.

There were interesting medical spin offs from this tactic which was the main project I wish to make. The cannon ball chain shot and bar shot which caused the greatest devastation between decks resulted in the tearing off of arms and legs and in the words of the pensioning pepper of the times in men being torn asunder in the bowels amongst the ignorant and illiterate seamen who served the big guns. There were therefore very few personal written records of their suffering. However once the literate and articulate officers and Non Commissioned Officers on the upper deck were involved in musket wounds we find their experiences recorded and their subsequent treatment frequently recorded for posterity in their journals. Thus I believe that the Royal Marines can claim credit for the establishment of many of the first Naval Medical records.

I would now like to move forward to the 18th and 19th Centuries to the times when the most important battle in the Royal Navy was that of conditions of men serving afloat. Conditions in the time of Queen Anne for example were I think epitomised in the words of Garth. Her personal physician. Steele complained to Garth that he was spending too long of his own in the Kit Kat Club to the detriment of his patients. Na Sir replied Garth. For many of my patients are in such foul conditions that nothing can possibly save them and the best are so fit that the combined skill of all my genius in the calm could not kill them. This was I am sure not the tradition of the Naval Medical Service at the time who were in the forefront of reforms.

During these years great changes had occurred in the Royal Marines. They were now housed ashore in fine barracks in the three grand divisions. But when they went to sea they were fleced with the relatively appalling conditions of the time. As an example fresh food was held aboard for 3 months and hard rations for from 6 to 8. Anyone who has left his fridge turned off over a weekend can imagine the state of these provisions. The cheese is hard as bullets fit only for carving buttons the butter rancid and the meats full of weevils. Scurvy was rife and there were plagues of flea and lice. The marines were naturally reluctant to go to sea from the background of living in than new barracks and so like the Medical Service they vowed to improve conditions afloat. By the end of the 18th Century great changes had occurred particularly in diets and provisions. But unfortunately these changes were largely unappreciated. The result was land embezzlement and plain fiddling by the victuallers and purvers to the detriment of the sailor. This tradition seems to have persisted to comparatively recent times.

In our modern day there are insufficient opportunities for many marines to serve afloat though in last more one carried in the LPHs and LPDs than were at sea in the big ships before World War 2. Now that the Commandos live and operate ashore in a variety of uncomfortable conditions from the Tropics to the Arctic we are eternally grateful that the Medical

Surv[illegible] embark[illegible] the [illegible] however [illegible] Medical Squadron [illegible] per cent [illegible] punish[illegible].

I am [illegible] morale of [illegible] Medical S[illegible] this was [illegible].

Every [illegible] however [illegible] stories [illegible] Singapore [illegible] his jacket [illegible] He had [illegible] medical [illegible] back to [illegible] where he [illegible] the medical [illegible] had been [illegible] on his [illegible] surprised [illegible] when he [illegible] equipment [illegible] He died [illegible] servants were [illegible] I feel it seemed [illegible] they had [illegible].

Me[illegible] himself and my fellow [illegible] appreciate all that the Royal Naval Medical Service [illegible] and how [illegible] the warmth and generosity [illegible] might.

OBITUARIES

SURGEON REAR ADMIRAL SIR HENRY WHITE KCVO, OBE, MD, FRCS died in South Africa on July 18 19[illegible] at the age of 87.

Henry Ellis Yeo White graduated in medicine at Edinburgh University in 1911 and joined the Royal Navy as a Surgeon Lieutenant in April 1913 retiring as a Surgeon Rear Admiral in 1948.

During the First World War he served in *HMS Excellent*, *HMS Commonwealth*, *HMS Prom[illegible]* and with HM Ambulance Train No 2 Medical Transport. He joined *HMS Renown* in 1919 accompanying the Prince of Wales to Canada and Australasia in 1920, the Far East in 1921-22 and on his Tours of South Africa and South America in *HMS Repulse* in 1925. Later in 1927 he accompanied the Duke and Duchess of York to New Zealand and Australia in *HM Royal Yacht Victoria & Albert* and after these successes he accompanied the King and Queen to Canada and the United States in 1939. During the Second World War he served in the RN Auxiliary Hospital Kingseat, RNH Simonstown and as MOIC RNAH Colombo. In 1947 he accompanied the King and Queen in *HMS Vanguard* on their tour of South Africa.

Sir Henry was created MVO in 1922, OBE in 1925, CVO in 1927 and KCVO in 1947. He became an Honorary Surgeon to the King in 1936.

In 1921 he married Adelaide Beatrice Napier. They had a son and a daughter.

SURGEON REAR ADMIRAL J. A. O'FLYNN CB, MD, BCh, DTM&H died on March 28 1976 at the age of 87.

Joseph Aloysius O'Flynn entered the Royal Naval Medical Service as a Surgeon Lieutenant on April 3 1912. He was promoted to Surgeon Lieutenant Commander in April 1918, to Surgeon Commander in April 1924, to Surgeon Captain in December 1935 and to Surgeon Rear Admiral in August 1944. He was placed on the Retired List on October 21 1945. He was Honorary Physician to King George VI.

The Editor is obliged to the Returned Servicemen's League in Australia for the following notice:

Admiral O'Flynn while attached to the Royal Navy's Armoured Car Division landed with the Australians at Gallipoli and remained there for some time before being ordered back to Egypt [illegible] evacuated casualties.

Later in the First World War he [illegible] Home Fleet under Earl Jellicoe.

Between wars his main work [illegible] malaria and the clearing of the swamps [illegible] the building of the Singapore Naval Base and [illegible] immunisation against diphtheria.

In the process of this he and his [illegible] proved that the [illegible] then used [illegible] children against the infection whilst [illegible] at the same time made him [illegible] unprotected person with whom they came into [illegible].

This latter work brought him [illegible] with workers as Dr H. Parish of the Wellcome Physiological Research Laboratories at the same time [illegible] subject of a question in the House of Commons concerning the safety of the experiments being [illegible].

In the Second World War he served in the Royal Marine Hospital in Deal which became the primary clearing station for the evacuation of the casualties from Dunkirk.

The end of the war found him as Principal Medical Officer Middle East in which position he was responsible for the rationing of the Forces medical facilities in the area and the clearing of the returning PsOW in both directions as the ships passed through the Suez Canal.

He emigrated with his wife to Australia in 1964 to join his sons who were already here and spend his last days at his home [illegible] Loch Lomond [illegible].

SURGEON CAPTAIN BROUGHTON RIDGWAY MB, ChB, DMRD, RN Retd. died on July 2 1976 at the age of 65.

Broughton Ridgway entered the Royal Naval Medical Service as a Surgeon Lieutenant on October 1 1936. He was promoted to Surgeon Lieutenant Commander in 1942, Surgeon Commander in 1951 and Surgeon Captain in 1961. He was placed on the Retired List on August 21 1968.

Surgeon Commander *J. A. B. Har[illegible] writes:*

Bill Ridgway died at his home in Sidmouth where he had lived since his retirement.

Bill qualified at Bristol in 1935 and joined the medical service in 1937. He soon became interested in

radiology but continuous employment in those days of sparse courses postponed his DMRD until 1957.

His first interests in radiology were with a portable unit with the Royal Marines at Lympstone. During the war he served as a radiologist in the hospital ship *Tuscalenga* and the auxiliary hospitals at Seaforth and Rainhill. He combined as was usual his radiological duties with anaesthetics.

After the war he served as radiologist in RN Hospital Mutley in Devonport, in RN Hospital Chatham and in *Pembroke*. He served in *Tarron* as DDMO and as radiologist and while in Singapore extended his experience with the Anti tuberculosis Association and in the RAF hospital. He returned as radiologist to RNH Plymouth in 1960 and retired as Consultant in Radiology in RNH Haslar in 1968.

Bill Ridgeyes will be remembered as a conscientious man with a concern for his patients and staff. His quiet modesty masked his long experience and skill in his specialty. His opinion was always freely given with quiet courtesy. He was a kindly family man and our sympathy is extended to his widow, son and daughter.

SURGEON COMMANDER D C DRAKE MRCS LRCP died on May 23 1976 at the age of 73.

Dennis Charles Drake entered the Royal Naval Medical Service as a Surgeon Lieutenant on September 10 1925 and was placed on the Retired List as a Surgeon Commander on May 24 1950.

His appointments included *HMS Pembroke Mauna Kirron Godetia Enterprise* RN Barracks Devonport *HMS Woodcock Watchful Raven Badger Leviathan* and *Cochrane*.

HONOURS & AWARDS

Queen's Birthday Honours 1976

Officer of the Order of the British Empire

Surgeon Commander L C Banks

Queen's Honorary Physician

Surgeon Captain F A F Mackenzie

Officers of the Order of St John of Jerusalem

Surgeon Rear Admiral P D G Pugh OBE QHS
Surgeon Captain G J Milton Thompson
Surgeon Commander H J A Hehn

Commander Medical Training Command

Surgeon Lieutenant D I Riddell

HIGHER QUALIFICATIONS

Surgeon Commander J J Nicholes — DIH
Surgeon Lieutenant Commander J O Seal — FRCS(Eng)
Surgeon Lieutenant Commander T G Shields — PhD
Surgeon Lieutenant B C Twin — DLO
Surgeon Lieutenant A Longstaff — MRCP(UK)

PROMOTIONS

To Surgeon Lieutenant Commander

J G Williams D C B Holt T Peer J G Saul
D A Graham D A Evans S H Vincent
W R B John

To Surgeon Lieutenant Commander (D)

Susan Perry I H O Martin Jones S Lambert
Humble A E Shepherd

To Surgeon Lieutenant

G A Turner P C N G Williams R J Whitney
R J H Robertson A W Mills I C Grant M C
Hempton R W G Weir R W Pakenham

To Surgeon Lieutenant (D)

J H Harker S R Bedham M J Laffan

To Acting Surgeon Lieutenant

N V Morgan S S Rolont C J Kalman D G
Bance J H Gebb A M Saywood J G McT
Wilson M M Stephens S D Glover W G
Murphy I F Geraghty C I McDonald K S Lloyd
S J Townsend I A Robertson S R Durham M
D Simmons J I C Hegg R W Hoare D W
Somerville H E Potts D G Jones

RE ENTRIES

Surgeon Lieutenant Commander K C Bouskill
Surgeon Lieutenant Commander (D) T R King

NEW ENTRIES

Surgeon Lieutenant P Robson D M Cooper
Surgeon Lieutenant (D) Anne L Edmunds M W Weston
Acting Surgeon Lieutenant A J H Stocking
Surgeon Sub Lieutenant R I Johnson A C D Rugeuf G W L Evans
M N Jeffrey S J Squires J Huay Drake Chuang
R G Benjafield C J Cahill
D Farmer P J G Hutchings
Surgeon Sub Lieutenant (D) D N Tulloch

TRANSFERRED TO 16 YEAR COMMISSION

Surgeon Lieutenant Commander I L Jenkins A C
Buck G M E Sewell M C M nk
Surgeon Lieutenant D A Evens E C Iwin

RETIREMENTS

Surgeon Captain L G H Clarke QHS
Surgeon Commander D H Elliott OBE
Surgeon Lieutenant Commander (D) R T Walker
Surgeon Lieutenant K H Smith

TERMINATION OF SHORT SERVICE COMMISSION

Surgeon Lieutenant Commander R W McCollum J R Bard m J E Flood C S Bonne
Surgeon Lieutenant E P Dekowski T S Powell M G Moore
Surgeon Lieutenant (D) H Warren S F Crow

WITHDRAWN FROM TRAINING

Surgeon Lieutenant K E M Waugh G O Smith
Actg Surgeon Lieutenant P W Duff

MEDICAL SERVICE OFFICERS

Officer of the Order of St John of Jerusalem

Commander A A Jackson

PROMOTION

To Lieutenant Commander

P Nicholas

Retired MS Officer

Lieutenant J Lyons has obtained an Honours Degree in Psychology at Brunel University

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

Queen's Birthday Honours, 1976

Miss F M Graystone Superintending Sister — *ARRC*

Officer of the Order of St John of Jerusalem

Miss S R F Barton *ARRC* Matron

PROMOTIONS

To Principal Matron

Miss S R P Barton *ARRC*

To Matron

Misses S H Wax *ARRC* J Robertson

To Nursing Sister

Miss M Day Assistant Head Naval Nurse

NEW ENTRIES

Senior Nursing Sisters

Misses L I Westcott E H Allington

Nursing Sisters

Misses S C Ames S L Mitchell E J Gash R Fairbrother V J Tomlinson A Whitehead

RETIREMENTS

Miss M A W Paterson *RRC* Principal Matron (Training)
Miss R Stone *ARRC* Matron
Miss E S M Lockhart *ARRC* Matron
Mrs S C Campbell (nee Skinner) Superintending Sister

ROYAL NAVAL RESERVE

PROMOTIONS

To Surgeon Lieutenant Commander

J A M Turner A S Harding R J McEndle P R Denham A M Davison M D Grant C V Howard R R K Broughton

RETIREMENTS

Surgeon Lieutenant Commander J R [illegible] R P Christie J P R Richardson

SAFETY IN THE HOME

[illegible]

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